JOURNAL

OF THE

History of Medicine

AND ALLIED SCIENCES

A QUARTERLY

Winter 1950

VOLUME V · NUMBER I

NEW YORK: HENRY SCHUMAN, INC.

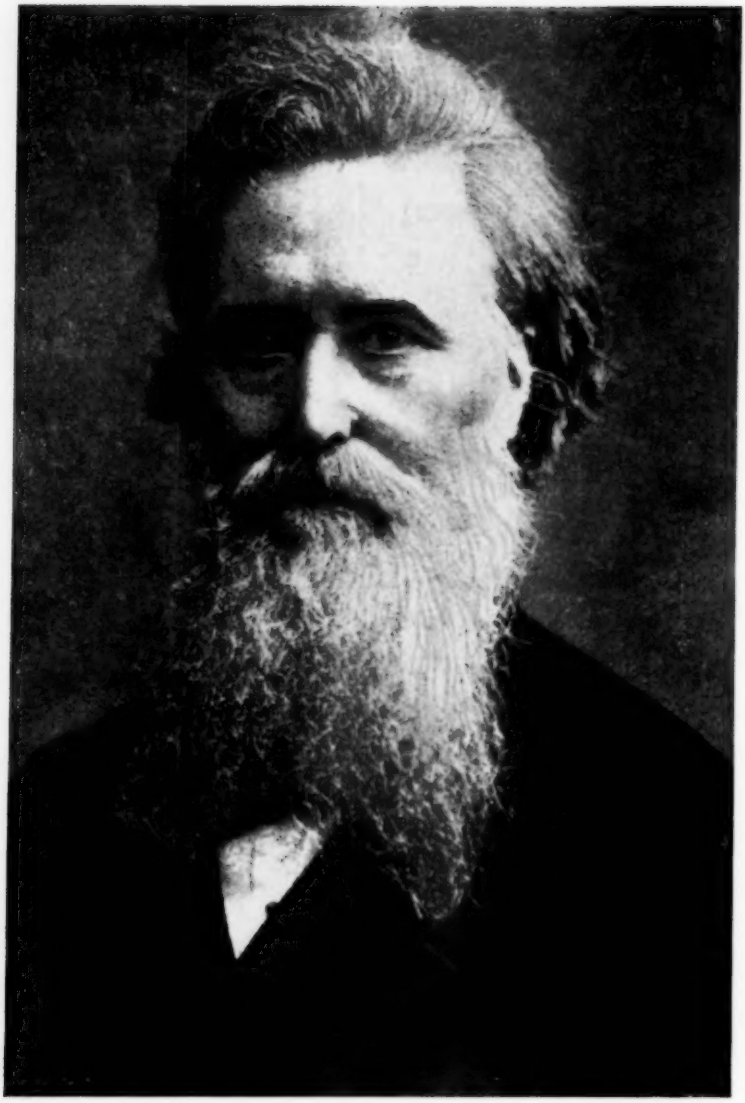
BOARD OF EDITORS

GEORGE ROSEN, *Editor*
MADELINE E. STANTON, *Assistant Editor*
ELIZABETH H. THOMSON, *Assistant Editor*

ERWIN H. ACKERKNECHT
MAX H. FISCH
JOHN F. FULTON
GENEVIEVE MILLER
LLOYD G. STEVENSON
MRS. JOSIAH C. TRENT

CONSULTING EDITORS

HOWARD ADELMANN, *Ithaca*
WYNDHAM B. BLANTON, *Richmond*
GEORGE W. CORNER, *Baltimore*
T. G. H. DRAKE, *Toronto*
WILLIAM W. FRANCIS, *Montreal*
CLAUDE E. HEATON, *New York*
EDWARD H. HUME, *New York*
OLOF LARSELL, *Portland, Ore.*
CHAUNCEY D. LEAKE, *Galveston*
W. B. MCDANIEL, 2d, *Philadelphia*
RALPH H. MAJOR, *Kansas City*
ARCHIBALD MALLOCH, *New York*
MARY LOUISE MARSHALL, *New Orleans*
J. M. D. OLMSTED, *Berkeley*
CURT PROSKAUER, *New York*
J. B. DEC. M. SAUNDERS, *San Francisco*
RAYMOND DE SAUSSURE, *New York*
RICHARD SCAMMON, *Minneapolis*
RICHARD H. SHRYOCK, *Baltimore*
GEORGE URDANG, *Madison*
HENRY R. VIETS, *Boston*
GREGORY ZILBOORG, *New York*
J. JOHNSTON ABRAHAM, *England*
JUAN RAMON BELTRÁN, *Argentina*
ARTURO CASTIGLIONI, *Italy*
F. J. COLE, *England*
A. CORSINI, *Italy*
O. COSTA MANDRY, *Puerto Rico*
SANTOS A. DOMINICI, *Venezuela*
FLAMINIO FÁVERO, *Brazil*
H. FISCHER, *Switzerland*
EDUARDO GARCÍA DEL REAL, *Spain*
JENS L. HANSEN, *Denmark*
J. JOAQUIN IZQUIERDO, *Mexico*
STEN LINDROTH, *Sweden*
JOSÉ LÓPEZ SÁNCHEZ, *Cuba*
CARLOS MARTÍNEZ DURÁN, *Guatemala*
RAYMOND NEVEU, *France*
VIRGILIO PAREDES BORJA, *Ecuador*
CARLOS ENRIQUE PAZ SOLDAN, *Peru*
D. V. SUBBA REDDY, *India*
RAFAEL SCHIAFFINO, *Uruguay*
HENRY E. SIGERIST, *Switzerland*
AUGUSTO DA SILVA CARVALHO, *Portugal*
CHARLES SINGER, *England*
I. D. STRASCHUN, *USSR*
A. SÜHEYL ÜNVER, *Turkey*



John Chapman, M.D. (1821–1894)
From *Westminster Review*, 1895, Vol. 143

John Chapman (1821-1894)

Publisher, Physician, and Medical Reformer

F. N. L. POYNTER*

IF ever Chapman's history is written fully and accurately," said Sir William Robertson Nicoll in 1913, "it would form a romance of the most extraordinary kind."[1] That history still remains to be written, and while many details of Chapman's life, for which we may well use the word "romance," have no place in medical history, there are many others which deserve our attention.

By the side of men like Vesalius and Harvey, Lister and Pasteur, he is, of course, a pigmy among giants; but these great pioneers, whose careers mark off epochs in the history of medicine, stand above the common level by their own right, and their stature has been demonstrated and measured by every medical historian. It is when we throw the light of research upon the ground from which they rise that we discover among the crowd of smaller figures some odd individuals who, by the errors, the false trends, the unsuccessful struggles which their careers exemplify, seem worthy of closer inspection, for the anatomy of failure can always be instructive. We find too those others who, while not achieving greatness in their chosen profession, have yet influenced its development at a critical period in its history and have besides brought to its problems a mind trained and experienced in some other sphere of activity.

John Chapman, publisher, physician, and medical reformer, would qualify for inclusion in either of these groups. He began to study medicine while a young man but his uncertain material circumstances prevented the completion of his studies and when at last, at the age of thirty-seven, he did obtain his degree, he had used the intervening period to such purpose that he was already a well-known publisher, the editor and proprietor of one of the leading English quarterly reviews, and the central figure of a group of men and women who were soon to be reckoned among the most celebrated of Victorian writers and leaders of thought.

He had cherished the ambition of making some great medical discovery which would make him famous. With such a background, and entering upon a medical career in full maturity, one would suppose that he

* Wellcome Historical Medical Museum, London, England.

[1] *A bookman's letters*, New York, 1913, p. 372.

brought to the new problems which confronted him the keen intelligence and capacity for independent thought which had made his *Westminster Review* the mouthpiece of the "philosophical radicals," and it would not have been altogether surprising if he had achieved his ambition.

Readily assimilating the new physiological teaching of Brown-Séquard and Claude Bernard, he introduced novel therapeutic methods by which he hoped to direct the attention of the physician from the mere symptoms of disease to its root causes. Unfortunately, his enthusiasm persuaded him to claim too much for his treatment. He stressed its value in the "cure" of cholera, so that it came to be identified with that disease, and when the intervention of no less a person than Robert Koch, by his discovery of the cholera vibrio in 1884, disproved his theories, his methods of treatment soon ceased to find supporters.

There was, however, one department of medicine in which he had great success. The relations between the doctor and the state, the internal organization of the professional associations, and the system of medical education are all topics which have a social as well as a purely professional importance. They were matters on which Chapman, by his interests and experience, seemed well qualified to speak. He expressed his ideas fully in the *Westminster Review,* the prestige of which was far greater than its circulation would indicate. His essays were noticed by leading members of the Cabinet and being welcomed as a thorough survey by "an impartial observer" they were of value to the government in the framing of the Medical Act of 1858.

Before considering the details of his medical career, it seems desirable, since he appears to have escaped the notice of the medical historian, to set down a brief outline of his earlier life and activities and to indicate the documents from which our knowledge of him is drawn. Chief among these are his own diaries, only two volumes of which are now known to exist, although there are indications that there were originally many more. These two small pocket diaries (for 1851 and 1860) were discovered on a bookstall in Sneinton Market, Nottingham, in 1913.[2] Together with a third volume, which contained consecutive entries for the first half of 1863 and scattered notes over a period of years up to December 1878, they were described by Mr. Sidney Race in three articles published in the *Nottingham Guardian* in 1915.[3] At some later date, the owner of the two earlier volumes sold them to a Nottingham bookseller whence, by the agency of

[2] G. S. Haight, *George Eliot and John Chapman,* New Haven, Yale University Press, 1940, p. ix.

[3] May 4, 18; June 1.

Mr. Gabriel Wells, they found their way to the unique collection of George Eliot's letters and papers in the Yale University Library.[4] In 1940, Mr. Gordon S. Haight, Professor of English at Yale, published these two diaries for the first time and added Race's description of the 1863 volume,[5] which could not then be traced and which Race now states is "lost irretrievably."[6] According to Haight, whose chief interest is in Chapman's literary connections, this volume was found in the possession of Mr. Clement Shorter who at one time planned to write a life of Chapman and who left a note stating that it "contained no literary references, but only records of Chapman's medical practice."[7] An extract copied from a diary of 1888 and quoted by Haight[8] was also found among Clement Shorter's papers, and suggests that other volumes of the diary may yet be found. Race informs us that Shorter told him "that he had purchased a diary from Mrs. Chapman's niece—most probably the one from which Haight's extract comes—and he said that he knew of others, which I gathered, though he did not say so, had been acquired by Sir William Robertson Nicoll."[9] In addition to the diaries there are also at Yale many of the letters which passed between Chapman and George Eliot, as well as other papers and letters of Chapman's.

Among printed sources there are frequent references to Chapman in Herbert Spencer's *Autobiography.*[10] Carlyle[11] and Browning[12] refer to him in their published letters. Cross, whose *Life of George Eliot* is the only substantial printed source quoted by J. G. Alger in his article in the *Dictionary of National Biography,*[13] was more concerned to obscure the truth than to reveal it, and is consequently more than reticent about Chapman. Alger's account is incorrect in several particulars, and even Haight's detailed study is not without some errors and omissions which, in two valuable articles contributed to *Notes and Queries,*[14] Race has corrected as well as adding further details of the 1863 diary.

II

John Chapman, the third son of William Chapman, was born on

[4] Haight, p. ix.
[5] *Ibid.*, p. 252.
[6] Private communication, May 21, 1946.
[7] Haight, p. 252.
[8] *Ibid.*, p. 117.
[9] *Notes and Queries,* May 17, 1941, p. 348.
[10] London, Williams and Norgate, 1904, 2 vols.
[11] *Letters to Mill, Sterling, and Browning;* ed. Alex Carlyle, London, 1923, pp. 288–9.
[12] *Letters,* ed. T. L. Hood., New Haven, 1933, p. 36.
[13] Supp. Vol. I, 1901, p. 414.
[14] April 26, May 17, 1941, pp. 293–5 and 347–9.

June 16, 1821[15] in Warser Gate,[16] Nottingham, where his father kept a druggist's and grocer's shop. In 1829 his family removed to the village of Ruddington, six miles outside the town, and here John Chapman spent the remainder of his boyhood until his father sent him to serve his apprenticeship to a watchmaker named Robert Mason, of Worksop.

He was an intelligent and handsome youth with so striking a resemblance to the portraits of Lord Byron that his comrades gave him the nickname of "Byron."[17] In his spare time he eagerly attended the lectures given by visiting literary and scientific celebrities at the Pestalozzian Institution in Worksop. It was probably the mental stimulus he received from these intellectual contacts which convinced him that he was fitted for something better than a watchmaker's shop, for he ran away from his master and sought refuge with his eldest brother Thomas who was studying medicine in Edinburgh. Thomas appears to have condoned his younger brother's escapade, for he neither sent him back to his master nor to his father but took the extraordinary step of arranging for him a passage to Adelaide, South Australia, and providing him with the money and the stock necessary for establishing himself in business as a watchmaker and optician.[18]

We do not know how long he stayed in Australia, but it could not have been long. We next hear of him in London where, according to an old school friend, he was studying medicine at St. Bartholomew's Hospital;[19] in 1842 he was in Paris, still pursuing his medical studies and counting Gay-Lussac among his teachers.[20] In 1843, he was employed as assistant to a surgeon at Derby and he described himself as a "surgeon" when, on June 27 of that year,[21] he married Susanna Brewitt, the daughter of a lace manufacturer in Nottingham, a woman of good education and thirteen years his senior.

Once again, the shades of the Pestalozzian Institution seem to have prevented him from devoting his full energies to his profession, for the young "surgeon" had been at work on a little book called *Human Nature* based on James Martineau's radical theological views, and only a few months after his marriage he went in person to offer his manuscript to John Green, of Newgate Street, a well-known publisher of philosophical and theological works. Having already decided to dispose of his business, Green was not in a position to accept the offered work, but Chapman, who

[15] Haight, p. 3 (where he states the day incorrectly—see p. 179); D.N.B. gives year as 1822.

[16] *Notes and Queries*, April 26, 1941, p. 293. Haight says Ruddington.

[17] *Athenaeum*, December 15, 1894, p. 828.

[18] Haight, p. 4.

[19] *Ibid.*

[20] Diary, January 4, 1851; Haight, p. 127; letter from Chapman to Johanna von Heyligenstaedt, October 24, 1861, Haight, p. 5.

[21] Haight (p. 5) quotes from a certified copy of the entry at Somerset House.

was always an opportunist in such matters, became the owner of Green's publishing firm and in February, 1844, he published the book himself.

He had now set up house at Clapton, in East London, and here began the series of weekly evening parties which were to bring together the most outstanding figures in Victorian thought and literature. In the summer of 1847 he took the lease of a large house at 142, Strand, using the ground floor as business premises while his wife arranged the upper part as a kind of private hotel. Chapman had connections with American men of letters, many of whom stayed at his house in the Strand when they came to visit England. One of the first of these was Emerson, an English edition of whose poems had been published by Chapman in 1846. He stayed with the Chapmans for nearly three months and in a letter to his wife referred to Chapman as "a phoenix of a publisher a man of integrity and talent in his trade."[22] Emerson was followed by many others, among whom were such eminent Americans as Horace Greeley, Noah Porter, W. C. Bryant and G. P. Putnam.

His house also served as a London centre for English writers. The most celebrated of those who stayed under his roof was George Eliot, who, when still using her own name of Mary Ann Evans, lived with the Chapmans for two years while she acted as sub-editor of the *Westminster Review*. Haight has dealt fully with this connection in his book *George Eliot and John Chapman*, and in his preface he asserts that "he was an important link in the chain of circumstances that transformed the country girl from Warwickshire into the most famous Englishwoman of her day."[23] How important a link he was it is difficult to overestimate. In 1846 he had published the first work from her pen, her anonymous translation of D. F. Strauss's *Das Leben Jesu*. It was while she was staying in his home that he introduced her to many of the famous people who visited him from time to time or were constant members of his weekly parties. Among these were Dickens, Thackeray, Carlyle, J. A. Froude, John Stuart Mill, Browning, Harriet Martineau, Mrs. Gaskell, Sir David Brewster, Herbert Spencer, Professor Richard Owen, W. E. Forster, George Combe, Francis Newman, Louis Blanc, W. R. Greg, Thornton Leigh Hunt—and G. H. Lewes.

In the four years from 1850 to 1854 she wrote many essays and articles at his request and suggestion, and in the latter year he published the only book which bears her real name on the title-page, *The Essence of Christianity by Ludwig Feuerbach. Translated from the second German edition*

[22] *Letters of Ralph Waldo Emerson*, ed. R. L. Rusk, 6 vols., New York, 1939, IV, p. 61.

[23] Haight, p. ix.

by Marian Evans. A few weeks after its publication she left England for the Continent with Lewes, and Chapman's circle lost at one blow two of its brightest members.

Herbert Spencer had met Chapman at a similarly critical period of his life. He was still a young railway engineer when he first went to one of Chapman's parties at Clapton in January, 1846.[24] Writing in his *Autobiography* of the year 1850, when he had become assistant editor of the *Economist,* his office being immediately opposite Chapman's house in the Strand, he says: ". . . my only opportunities of meeting strangers occurred at the house of Mr. Chapman (afterwards Dr. Chapman) to whose evening parties I had already been once or twice while he lived at Clapton. . . ."[24] He, also, owed to Chapman the publication of his first book, *Social Statics,* and acknowledges the value of Chapman's encouragement—"The moral of these facts is that in the absence of a sympathetic printer, and a sympathetic publisher (for Chapman was anxious to bring out the book) . . . the book would not have been issued at all."[25] It was Chapman who introduced Spencer to Auguste Comte when, in 1856, he gave him a letter of introduction to the French philosopher and asked Spencer to take him his share of the profits in Harriet Martineau's abridged translation of the *Philosophie Positive* which Chapman had published in 1854.[26]

At no time were Chapman's interests confined to the mere material production of books but extended also to the ideas which they contained. It was probably due to his lack of systematic scientific training that he did not pursue his own lines of thought to their conclusion, but he possessed that type of "fertilising" mind which throws off speculative ideas that kindle enthusiasm and stimulate creative thought in others. Often, when he perceived that something might come of this mental contact, he would not be content until the results were embodied in an essay for his review.

In his Diary, January 4, 1851, he writes: "The afternoon passed with . . . Herbert Spencer. In the course of conversation the latter was astonished to find me propounding a theory regarding population which he conceived to be peculiarly original with him; viz., that the power of reproduction is in an inverse ratio with the perfection of the individuals constituting the race, and several important applications of the doctrine, it seems, have been equally worked out by both of us. He told me the ideas had been familiar to him these two years,—I told him I worked them out for myself

[24] Spencer, *Autobiography,* I, pp. 294 and 347–8.

[25] *Ibid.,* I, 356–7.

[26] *Ibid.,* I, 492.

in Paris,—eight years ago; and that I was glad there was a chance they would now get utterance."[27]

Spencer, writing to his father on May 21 of the same year, says: "Chapman . . . is about to have the *Westminster Review*. It will come into his hands at the end of the year. Chapman has twice proposed me to write an article for the January number. The first time he proposed the population question on which he knows my views. But I declined on the ground that I wished to make it the subject of a book."[28]

By December 9, Chapman had persuaded him to change his mind, and he agreed to do the essay.[29] Meanwhile, he had been asked by Chapman to prepare a notice of a recently issued edition of W. B. Carpenter's *Principles of Physiology*. "In the course of such perusal as was necessary to give an account of its contents, I came across von Baer's formula expressing the course of development through which every plant and animal passes in the change from homogeneity to heterogeneity."[30]

This led to further thought on his "development hypothesis" and in the essay on "A Theory of Population" which Chapman published in the April 1852 number of the *Westminster Review* he wrote: "For as those prematurely carried off must, in the average of cases, be those in whom the power of self-preservation is the least, it unavoidably follows that those left behind to continue the race, are those in whom the power of self-preservation is the greatest—are the select of their generation."[31]

If these had been the lines along which Chapman had been thinking as early as 1843, when he was a young man of twenty-two, it is not surprising that when, eight years later, he read Darwin's *Origin of Species,* he should write of it in glowing terms. "It impresses me as one of the most important books of this century, and is likely to effect an immense mental revolution. The sagacity, knowledge and candour displayed in the work are unusually great and wonderful."[32]

This immediate and unreserved appreciation of a great theme argues an unusual insight and mental ability, from contact with which Spencer must have profited. Having admitted that "my only opportunities for meeting strangers occurred at the house of Mr. Chapman,"[33] Spencer acknowledges the debt he owed to Chapman and his circle when he writes, "I think I may say that the character of my later career was mainly deter-

[27] Diary, January 4, 1851; Haight, pp. 126–7.
[28] Spencer, *Autobiography*, I, 372.
[29] *Ibid.*, I, 388.
[30] *Ibid.*, I, 384.
[31] *Westminster Review*, April 1852, pp. 499–500.
[32] Diary, February 21, 1860; Haight, p. 237.
[33] Spencer, *Autobiography*, I, 347.

mined by the conceptions which were initiated, and the friendships which were formed, between the times at which my connexion with the *Economist* began and ended (*i.e.*, 1848–53)."[34]

Spencer's reference to Chapman's acquisition of the *Westminster Review* notes the beginning of a connection which was to last for forty-three years. Since 1824, when James Mill had established it with funds provided by Jeremy Bentham, the *Westminster Review* had changed hands several times. Under the editorship of James Mill (1824–28) and his son John Stuart Mill (1837–40) it had won a foremost place among English reviews. The proprietors and editors during the intervening periods were less talented, and when Chapman began to discuss its purchase in 1850 it was kept alive more by its past reputation than by its present achievements. In October 1851, Chapman became its proprietor at a cost of £300 and in January 1852 he issued the first of a brilliant new series, George Eliot acting as his assistant editor.

Chapman was generous to a fault with his contributors and for each number he paid out £250 in authors' fees alone, "an enormous sum for a quarterly that printed only 650 copies."[35] The inevitable result was that his affairs were always on the verge of bankruptcy. Haight does not think highly of Chapman's skill in business, and it must be admitted, not perhaps to his discredit, that Chapman was no "business man." Like Mr. Micawber, he was always hopeful of "something turning up," and he persisted in an uneconomic enterprise which became a perennial stimulus to English thought, especially in the fields of religion and the social sciences.

The affairs of his publishing house were in a similarly unpromising state. The works in which he specialised were books of great importance which no other publisher would have risked including in his catalogue, so obvious was it from their very titles that they could never become "best-sellers."

His characteristic of sacrificing profit to principle is seen most clearly in an incident which had repercussions throughout the world of letters. One department of the business which he had taken over from John Green was devoted to the sale of books, and it was his practice to allow a discount on all books purchased. This underselling was strictly forbidden by the powerful Booksellers' Association, of which he was not a member. Chapman was, on principle, opposed to every such infringement of individual rights and he openly challenged the Association. To the April 1852 number of the *Westminster Review* he contributed an article entitled "The Com-

[34] *Ibid.*, I, 424.

[35] Haight, p. 56.

merce of Literature" in which he exposed the evil results of this arbitrary price-fixing. Many authors who considered themselves penalised by the prevailing system openly supported him in his campaign. Chapman agitated to such purpose that the Association was forced to agree to submit its case to a committee headed by Lord Campbell, the Chief Justice, and to abide by its decision. Lord Campbell demanded that the case of the "Free Traders" should be heard and on May 4, 1852, at Chapman's invitation, there was a meeting at his house in the Strand of some of the most celebrated authors of the day, with Dickens in the Chair.[36] Among those who were not able to attend but who sent supporting letters to be read at the meeting were Carlyle and Gladstone. Chapman spoke eloquently for the free-traders. Describing the meeting in a letter, George Eliot says that he "read his statement very well and looked distinguished and refined even in that assemblage of intellectuals. . . . He has worked well and in a good spirit at this great question and has shown a degree of talent and power of mastering a subject which have won him general admiration."[37]

He won his case. Longman and Murray took their defeat graciously and the Booksellers' Association agreed to dissolve. Soon, all the booksellers were offering books at discount, and Chapman, finding that he no longer enjoyed the advantages accorded him by his free-trading methods, saw his affairs going from bad to worse.

III

It was at this stage in his career that he decided to qualify for the practice of medicine. In view of his earlier experience as a "surgeon" it is not strange that the security offered by such a profession should have appealed to Chapman, and this he frankly admits. With his family responsibilities—he now had three children—his material concerns were becoming increasingly pressing, and there is no need to impute to him cynical motives for his decision.[38]

One of his closest friends at this time was Barbara Leigh Smith, a cousin of Florence Nightingale and a granddaughter of the William Smith who defended Joseph Priestley after his flight to London. She was an ardent feminist and one of the founders of Girton College.[39] In 1857 she married Dr. Eugene Bodichon, a Breton physician who had worked for twenty years among the natives of North Africa.

[36] See "Report" 1852 in list of writings at end.
[37] Haight, p. 52.
[38] See Haight, p. 114.
[39] See Barbara Stephen, *Emily Davies and Girton College*, London, 1927, pp. 40–42.

Writing to her on September 15, 1855, he says: "And so you really think I should make a good Doctor! I have always felt that I should, and I wish I were one. It would be a great relief to me, when I am no longer in business, to have a medical degree to fall back upon."[40] Apparently he had already given serious thought to this plan, for he had worked out the number of lectures he would need to attend and the total cost involved if he were "to resolve on becoming a Doctor in 1857."[41]

It is a significant reflection on the state of medical education at this time that Chapman could contemplate preparing himself for a medical degree within the short space of nineteen months, and in the spare time allowed by many and exacting business interests. Yet this is what he actually achieved. He attended lectures at University College in Gower Street and at King's College in the Strand and he appears to have taken his studies seriously, for he complains of the rowdiness of the younger students which often spoiled the lectures of Dr. Budd and Sir William Ferguson at King's College.[42] For his clinical studies he attended St. George's Hospital, where his friend Dr. Edwin Lankester was lecturer in materia medica, and with further assistance from the well-known "grinders" Messrs. Power and Mr. Hinde, to whose methods he gives warm praise,[43] he was able to present himself for examination at St. Andrews on May 6, 1857 and to obtain his M.D.

Whenever he touches on Chapman's medical career, Haight does him less than justice and seems to be lacking in historical perspective. However and wherever they gained their medical qualifications, the fact remains that Britain at that time could boast of as many competent physicians and successful surgeons as any other country. The evils of the day were notorious, and Chapman himself was foremost in bringing them before a wider public than could be reached by the purely professional journals. When Haight singles out St. Andrews as the "worst offender" in selling degrees, the figures which he quotes are all for years subsequent to the passing of the Medical Act and between three and five years after Chapman's graduation.[44] The figures given by Chapman show that in the ten years previous to the passing of the Act an average of fifty candidates (of which one-eighth were rejected) presented themselves each year, compared with an average of five hundred who took the examination at the Royal College of Surgeons.[45] "We are informed," says Chapman, "that of the last eighty rejected candidates 39 held the diploma of the same College (*i.e.*, of Sur-

[40] Haight, p. 93.
[41] *Ibid.*
[42] Chapman, *Medical Institutions*, 1870, p. 90.
[43] *Ibid.*, pp. 93–6.
[44] Haight, p. 94.
[45] Chapman, *Medical Institutions*, 1870, p. 6.

geons)." He goes on to state that "Before the Medical Act was passed, the St. Andrews examination was already conducted both in writing and viva voce, it extended over several days, it was both scientific and practical, and its general excellence obtained for it the commendations of the medical journals of the time."[46]

Haight is in error when he implies that Chapman's degree did not allow him to practise in London.[47] It did not carry the *legal* right to do so, but the Royal College of Physicians had long since ceased to use its powers of proscription. It was not essential therefore for Chapman to become a Licentiate before he commenced practice. Haight, acknowledging that the Royal College of Physicians was "the most exacting both in its examination and its fee," asserts that Chapman "chose the easiest course"[48] in going to St. Andrews, but makes no comment on the fact that within a few months of doing so he also became a Licentiate of the Royal College of Physicians. Three years later, after two months' intensive study with Mr. Hinde, he became a Member of the Royal College of Surgeons.

His position as editor of an influential review which he retained until his death gave him unusual opportunities for publishing his views on all matters which engaged his interest and it was not long before his medical preoccupations were reflected in the pages of the *Westminster Review*. Projected reforms in the organization of the medical profession had been under discussion ever since the Parliamentary Commission had issued its report in 1834. Chapman belonged to a school of political thought which upheld "genuine Liberalism . . . and reprobated the excesses of Government-meddling."[49] In April 1856 he published in his review his own article on "Medical Despotism" in which he attacked the proposed medical reform bill on the grounds of "legislative interference" and "flagrant encroachment of the fundamental rights of English citizens."[50]

In April 1858 he contributed a second essay on "Medical Reform" and in July of the same year another on "Medical Education." These were both full and well-documented accounts, not only of the unsatisfactory state of affairs then existing, but of the historical developments which had made demands for reform inevitable. On July 24, 1858, the editor of the *Medical Times and Gazette* wrote: "It becomes a duty for us to draw attention to two articles which have appeared in the *Westminster Review*, especially as it is well known that they have had a marked influence in inducing the Government to assist in passing the modified Bill of Mr. Cowper."

[46] *Ibid.*, p. 74.
[47] Haight, p. 94.
[48] *Ibid.*, p. 95.
[49] Spencer, *Autobiography*, I, 421.
[50] *Westminster Review*, April 1856, p. 538.

Twelve years later Chapman added to these articles and republished them in the *Medical Mirror*[51] and in 1870 they were published in book form with the title *The Medical Institutions of the United Kingdom: A History Exemplifying the Evils of Over-legislation.* Referring in the preface to the influence of the original articles on the framing of the Medical Act, he adds: "The writer cannot, however, take to himself much credit for this result. The fact was, successive Ministers had been so bewildered by the widely different representations made to them of what constituted the political grievances of the Profession, and what Medical Reform ought to achieve, that Mr. Walpole, then Secretary of State for the Home Department, regarding these articles published in a non-professional Review as impartial and reliable, was glad to avail himself of them as a source of information uncoloured by party interests."

Chapman's opening remarks are of particular interest to the medical historian. "No public opinion," he states, "and no satisfactory legislation on medical affairs is possible until Ministers, as well as Parliament and the people, become acquainted with the history of our medical institutions, and of their effects on the public and on each other. But no such history at once sufficiently brief and intelligible to command attention exists."[52] It was his purpose in writing this work to supply such a history. After a brief introductory survey of the history of medicine from the time of the Alexandrian School onwards, for which he quotes as his authorities Freind and Renouard, he commences the main body of his work by dealing with the Acts of Henry VIII which were the first of a long series of legislative enactments investing exclusive rights and privileges in the medical corporations.

He describes the "selfish conflict" and "ceaseless injustice" which followed from the establishment of these "vested interests." "But only in proportion as they are artificially fostered by the State is their resistance injuriously prolonged, only then can they so completely deaden enterprise and stifle competition as to destroy the very life they were appointed to foster."[53] He produces abundant evidence, with recorded testimony, of the many occasions on which the Royal Colleges had proved themselves inimical to the true interests of the profession and to the progress of medical science. "But though men like Dr. Wells, Dr. Fothergill, Dr. William Hunter, Dr. Copland and Dr. Locock were not admissible into the College (of Physicians), Charles Duke of Richmond and John Duke of Montague, slight dabblers in medical science and never practitioners, were found eligible and were elected."[54] He cites the opposition of the same College to the de-

[51] N.S. Nos. 7–13, 1869–70.
[52] Chapman, *Medical Institutions*, 1870, p. 1.
[53] *Ibid.*, p. 40.
[54] *Ibid.*, pp. 68–9.

mand of the Medico-Chirurgical Society for a Royal Charter, and the antagonism of both Physicians and Surgeons to the new London University, while he gives a lively account of the discreditable episode when, by their neglect, the Surgeons allowed Sir Everard Home to make away with John Hunter's manuscript volumes after they had been purchased from public funds and entrusted to the College for safe-keeping.[55]

His strictures on the teaching methods in medical schools are given added point by his own experiences, which were still fresh in his mind, but he does not content himself with mere destructive criticism. Firmly believing that in a free society the most talented naturally assume leadership, he advocated the abolition of those exclusive rights, conferred by government, which set a premium on mediocrity. "In April 1856, we expressed at length our objections to the forcible constitution of any central council whatever as a government organ for exercising supreme jurisdiction over the profession of surgery and medicine, and recommended the simple expedient of severing the connexion of all medical bodies with the State."[56] The profession should be completely self-governing and democratic. Careful to protect the value of their own qualifications, members of the various corporations would insist on the maintenance of high standards, and the institutions would, as Chapman puts it, "compete *upwards* with one another in ensuring the best possible education to their members whose enlarging views and increasingly noble purposes they would continuously and faithfully represent."[57]

Such, then, were the views which Chapman put forward in 1858. He admits himself that while his survey of the problem was of value to the government his suggestions for reform were not accepted. Writing in 1870, he says: "Our prophecies published at that date have been fulfilled; the power of the corporations has been consolidated; the 20,000 members of the Profession are still denied a voice in the framing of their own constitution, in administering their own government, or in disposing of their own funds; and now the half of these usually quiet and submissive subjects of the Medical Council, goaded into anger by the long endurance of this injustice and tyranny, are in a state of tumultuous agitation bordering on revolution. Amid the confusion of divided counsels, the complacent ignorance, the ambitious meddling, and the conflicting plans of would-be medico-political leaders now observable, the compact and combined forces of despotism and bureaucracy will probably again achieve an easy victory."[58]

In these words one can perceive the spirit of the man who had, at the

[55] *Ibid.*, pp. 103–7.
[56] *Ibid.*, p. 48.
[57] *Ibid.*, p. 119.
[58] *Ibid.*, pp. 109–10.

age of thirty-one, challenged and broken the powerful Booksellers' Association, but who now sadly acknowledges the growing power of the "combined forces of despotism and bureaucracy."

Chapman's contribution to medical history, which had emerged as a side issue from his zeal for reform, did not end with these essays. In 1858 he had contributed to the *Medical Times and Gazette* two short articles on "Chloroform and other anaesthetics: how they act, how they kill, and how they may be safely used"[59] which were reprinted as a small pamphlet later in the year. This was merely an ordinary piece of medical journalism, presenting a useful summary of known facts. In the following year he published a long essay in the *Westminster Review* on "Chloroform and other anaesthetics: their history and use during childbirth,"[60] and this too was reprinted in the same year as a small book of fifty-one closely printed pages. Well documented and clearly written, it is a compact survey of the history of anaesthetics from the earliest times, based on such authorities as Sir J. Y. Simpson (*Obstetric Memoirs,* 1855), John Snow (*Chloroform and Other Anaesthetics,* 1858), Esdaile (*Mesmerism,* 1852), Sir H. Davy (*Fragmentary Remains,* 1858), Bigelow (*Aether and Chloroform,* 1848), and Channing (*Etherization in Childbirth,* 1848). Written at a time when the discovery was still comparatively recent, his account gives evidence of a good historical sense and sound judgment, and he does not fail to assess the contributions of Priestley, Lavoisier, Beddoes, Davy, Hickman, Wells, Morton, Jackson, Bigelow, and Snow. In the great controversy over the use of chloroform in childbirth he declares himself a supporter of Simpson.

That Chapman had the time, within the first two years of his entering the medical profession, to write these papers in addition to carrying on his publishing business and editing the *Westminster Review* does not argue a very flourishing practice, and, in fact, as late as July 1860 he admits that he is still "waiting for practice."[61] In his Diary, he notes a call on Dr. Brown-Séquard, "who said a serious objection to me might possibly be raised that I had been in business."[62] He had long been trying to dispose of his publishing interests, which had become a burden, and in 1860 he succeeded in transferring them to a young man named George Manwaring; but within two years Chapman and Octavius Smith, his chief backer, were forced to take back the business when Manwaring declared himself unable to meet his obligations. A more satisfactory arrangement was arrived at when, in 1862, Trübner and Co. took over responsibility for all Chapman's (and

[59] October 23 and 30, 1858.
[60] *Westminster Review,* No. 72, Jan. 1859.
[61] Diary, July 24, 1860. Haight, p. 245.
[62] *Notes and Queries,* May 17, 1941, p. 347.

Manwaring's) publications while Octavius Smith agreed to join in a fund for the support of the *Westminster Review,* of which Chapman was to remain editor. Henceforth, Chapman was able to confine his attentions to the editing of the *Review* and to the practice of medicine.

Early in 1858, he had removed from Blandford Square, where he had been living for three years after leaving his house in the Strand, and settled at 1, Albion Street, Hyde Park. It was in this house that he was 'waiting for practice' when, in 1860, he was weighing up the advantages of taking a country practice or of remaining in London and endeavouring "to cultivate a practice among insane patients."[63] The treatment of mental disease seems to have held a special appeal for him and his views on psychological medicine are remarkably enlightened and forward-looking: "But the diseases of persons," he writes, "whose minds are highly cultivated and developed, are often complicated, modified, and dominated by subtle psychical influences, whose intensity and bearing on the physical malady it is difficult to apprehend and appreciate, and which it is still more difficult to contend with and control. In other words, the more civilised and refined people are, the more individual, peculiar, and manifold do their natures become; and in proportion as their ideas, interests and emotions are many-sided and complex, will be the ascendancy of the mind over the body, and the consequent need that their medical advisers should be psychologists and moral philosophers as well as physicians."[64] And again: "In proportion as the wonderful influence of the mind on the body shall be recognised and appreciated, the office of the physician will be exalted, and he will become more and more habituated to track the causes of a large amount of disease into the secret recesses of the soul itself. He will find that his remedies to be successful must too often be applied there."[65]

By January 1863, when he removed to Somerset Street, Portman Square, he appears to have succeeded in his intention of specialising in this department, for he retained his former residence in Albion Street "as an office and for the accommodation of boarding patients, principally insane."[66] It is highly probable that it was from his practice with this type of patient that he derived such an exaggerated belief in the efficacy of his "spinal ice-bag," a method of treatment which he had suggested to Barbara Leigh Smith as early as 1856,[67] and it is doubtless this "discovery" which was in his mind when he wrote to his friend Lord Stanley "telling him

[63] Diary, July 24, 1860. Haight, p. 245.
[64] Chapman, *Medical Institutions,* 1870, p. 84.
[65] *Ibid.,* p. 53.
[66] Clement Shorter's transcript. Haight, p. 113.
[67] Haight, p. 114.

explicitly of the nature of my discovery to cure epilepsy. I gave him this information by way of establishing my claim to it, if it should hereafter be disputed."[68] On this slender basis he now constructed a system of "Neuro-Dynamic Medicine," the principles of which were founded on his belief that practically all diseases were of nervous origin and the practice of which consisted in applications to the spine, over long periods, of sources of local heat and cold. Reviewing what he considers his "success" in 1872,[69] he writes: "I am disposed to regard the progress already made in diffusing a knowledge of the principles and practice of Neuro-Dynamic Medicine as very encouraging and corroborative evidence of both the truth of the one and the efficacy of the other. It is scarcely ten years since the first crude expression of these was published;[70] in 1863 the first book on the subject was issued. That book was a monograph on the Functional Diseases of Women."

In extending his methods of treatment to these diseases he had sufficient success to be gratified by the results, as was also the case when he recommended his "spinal ice-bag" for sea sickness (1864), but in 1865 he published a work in which he claimed to "cure" cholera "through the agency of the nervous system, by means of ice."[71] It would be easy for us, looking back from the mid-twentieth century, to adopt a patronising attitude and dismiss Chapman's "neuro-dynamic medicine" as quackery, and, indeed, this is exactly the view taken by Haight, but the reception given to his theory by many eminent practitioners of his own day was somewhat different. Marion Sims recommended to his students Chapman's *Functional Diseases of Women.*[72] The first edition of his book on cholera was quickly sold out and within a few months a greatly enlarged second edition was in the press. Clifford Allbutt, reviewing this in the *Medical Press and Circular,*[73] stated that it "displays an amount of insight and originality, as well as logical cogency, which cannot fail to commend it to every philosophical mind," while Sir Andrew Clarke, in a long review written for the *Medical Times and Gazette*[74] admitted, with cautious reservations, that "Even a false theory when rightly constructed has its uses and instead of hindering, hastens the advance of knowledge. . . . Dr. Chapman's theory is in harmony with the most recent physiological investigation; it is ingenious, clearly put, happily illustrated, logically argued . . . and will take a permanent place in the history of the disease

[68] *Notes and Queries,* May 17, 1941, p. 347.
[69] Chapman, *Neuralgia,* 1873. Preface.
[70] See list of writings at end: 1863 (first item).
[71] See list of writings at end: 1865.
[72] J. Marion Sims, *Clinical notes on uterine surgery,* 1866, p. 41.
[73] October 4, 1866.
[74] November 3, 1866.

which it treats." W. B. Carpenter, the physiologist, considered his "researches as of the highest physiological interest and theraputic value,"[75] and Ernest Hart, physician at St. Mary's Hospital and editor of the *British Medical Journal,* expressed his belief that "the profession is indebted to him for a valuable contribution to the healing art."[76] In 1867, he read a paper on his treatment of epilepsy to a lively and well-attended meeting of the Medical Society of London, the meeting being twice prolonged beyond its usual time at the request of the members. Even the sceptics admitted that they had achieved some success in some cases with his treatment.[77]

Chapman was now on the staff of the Metropolitan Free Hospital and the Farringdon Dispensary, of which the chief physician was his old friend and teacher Dr. Edwin Lankester, who offered to contribute an article on Chapman's discovery to the *Athenaeum.* In conveying the information to the editor, Chapman writes: "I am so far a believer in myself as to venture the assertion that the time will come when the medical doctrine and method I am preaching will be so generally known and practised that spine-bags will become articles of domestic furniture as indispensable as tea-kettles!"[78] For nearly thirty years "Dr. Chapman's spinal ice-bag" was figured in S. Maw, Son and Thompson's catalogue. It is a long and narrow india-rubber bag, some twenty-four inches by eight inches, divided into three or more compartments and secured by a clasp. By its side is "Dr. Chapman's india-rubber bag for hot water." Chapman had patented them both in 1867, and it is a descendant of the latter, with its screw top, which has won the universal popularity he desired for his ice-bag.

Even after Koch had published his discovery of the cholera vibrio in 1884, Chapman was reluctant to give up his theory and in an essay in the *Westminster Review*[79] he attempted to discount the findings of the great bacteriologist. If excuse be needed for his obstinacy, it must be remembered that he was already sixty-three and that he was not alone in his refusal to accept Koch's discovery. The famous Max von Pettenkofer set so little store by it that he swallowed a pure culture of Koch's bacillus and, by some strange chance, suffered few ill-effects from it. Chapman also found support for his stand in the report of the Marseilles Commission which was investigating the French cholera outbreak of 1884 and which arrived at the conclusion that the nervous theory of cholera was that which best explained its physiological pathology. During the Paris epidemic in that

[75] Chapman, *Cholera curable,* 1885, p. ix.
[76] *Ibid.*
[77] Chapman, *The treatment of epilepsy,* 1889, passim.
[78] Chapman to Wm. Hepworth Dixon, March 10, 1868; Haight, p. 115.
[79] October 1884, *122,* 472–533.

year he was invited by Professor Peter to treat twelve cases in the Hôpital de la Charité. Ten of Chapman's patients recovered, while of the other cases which were simultaneously treated within the same walls by other means only 52 per cent survived.[80]

But whatever may have been the value of his treatment, his theories were doomed to oblivion with the rise of the new epidemiology, although he continued to press their claims until shortly before his death in 1894.

Before closing this brief study of John Chapman we must touch upon the events which led him to spend the last twenty years of his life practising his profession among the English colony in Paris. These are material for a romantic novel rather than a scientific paper, but our survey of his life would not be complete without some reference to them. Chapman's views on the marriage tie were anything but orthodox, especially in his own day, and in June 1863 he and his wife agreed to separate. Such a step must have been long anticipated for in 1862 he reported a conversation with his friend Andrew Johnson, Principal of the Bullion Office of the Bank of England and personal friend of Karl Marx and Freiligrath: "His opinion is strongly against my going into the country with a view to practise my profession. As he says, if I do that I must be prepared to live what is called 'respectably,' to conform to present ideas in respect to my social life, as he does, and to forego all expression of my real convictions: . . . Wherever I go I will strive above all things to be and seem myself. . . ."

"Only if I cannot live here in modest comfort should I be justified, as it seems to me, either on public grounds or by expediency, in leaving this country. Of course, I claim the right to order my own private and domestic life as shall seem to be best, and if as a condition of obtaining an adequate income English Society insists that I shall live in the same house with a person who is repulsive to me, then I shall feel it my duty to live in such place and in such manner as will best insure my individual freedom."[81]

Apparently, "English Society" did so insist for in 1874 he left London for Paris where in 1879 he married Hannah Macdonald, a widow twelve years his junior and a woman of considerable character and charm. He established his office at 224, Rue de Rivoli, above Galignani's, and his name figured prominently among the recommended physicians in the English editions of Baedeker. His home at 46, Avénue Kléber, where his second wife proved an admirable hostess, continued to be a centre for English, American, and French writers and radical politicians and journalists until his

[80] Chapman, *Cholera curable*, 1885, p. xii.

[81] Chapman to Johanna von Heyligenstaedt, March 6, 1862. Haight, p. 113.

death. Late in 1893 he was involved in an accident with a cab and he suffered broken ribs and other injuries which were a direct contribution to his death on November 25, 1894. His body was brought to England and buried just behind George Eliot's grave in Highgate cemetery. A year later his widow procured a warrant for his reinterment in a more prominent position close to the path and only a few yards to the right of George Eliot. Mrs. Chapman was later buried in the same grave which is marked by a flat stone.[82]

His first wife had died in 1892 at the age of 84; his son Ernest, who was an analytical chemist, had lost his life in a laboratory accident in the Harz Mountains in 1872 when he was only twenty-six years old. As recently as 1915, his widow was discovered living in Hammersmith Infirmary by Mrs. Cobden Sanderson, who installed her in apartments in Manor Place, Paddington, and for a few days her story, rich with the memories of Victorian celebrities, among which Chapman's name was prominent, could be read in the newspapers of the time. She, too, died in tragic circumstances, for only a few months later she accidentally set fire to her bedclothes and was burned to death.

There is no doubt that in Chapman's character there were traits which could be disastrous to any physician and which Haight has fully illuminated. We are indebted to Mr. Sidney Race, who had opportunities of speaking to many of Chapman's relations and friends, for a more pleasing picture which tends to show that "he was the victim of the admiration which his beauty created," and to demonstrate that this is no exaggeration he quotes an interesting description of him by the late T. P. O'Connor: "A curious, intensely interesting, slightly mysterious, wondrously attractive creature, Dr. Chapman was . . . a strikingly handsome man. I did not know him till he was an old man, but even then he was beautiful. He was upwards of six feet high, had massive and at the same time beautifully chiselled features, large, brown, soft, inscrutable eyes, a beautiful mouth,

[82] The writer is grateful to Mr. Gordon Haight, who read the paper in proof, for pointing out an error based on Race (*Notes and Queries*, May 17, 1941, p. 348) who wrote: "Though he was buried near to George Eliot in Highgate cemetery, as Mr. Haight states, his widow had the body removed later to a grave on the opposite side of the path. Mrs. Chapman herself told me this, and it has been confirmed to me by her nephew who was present at the first interment. No stone marks the grave."

A personal visit to Highgate cemetery confirmed the fact that there *was* a reinterment, but only from the third to the first rank of graves, on the same side of the path. The original site is now the grave of Charles Watts, founder of the Rationalist Press Association. The stone on the second grave is inscribed: "In / Memory / of / Doctor John Chapman / Born 1821 — Died 1894 / Editor & Proprietor of / The Westminster Review / Also of / Hannah Chapman / Born 1833 — Died 1916 / Second Wife of the Above / Who on the Death of Dr. Chapman / Continued the Publication / of / The Westminster Review / under her Own Editorship."

a beard, long, white, patriarchal, a carriage erect, dignified, impressive, and above all that indescribable quality called magnetism. Whether it was that he spoke but little, or that he carried himself so proudly, or that he suggested a certain impenetrable reserve, in spite of extraordinary courtliness of manner, whatever the reason there was always something about him that impressed you."

"His relatives have told me," says Race "[that he was], not fond of surgery, but in medicine he was a competent practitioner, despite his fondness for his ice-bag remedy. . . . Those who knew him best bear witness to his great kindliness, to his truthfulness, and to his tenderness towards suffering."[83]

This is valuable testimony to set against Haight's doubts of his sincerity and enables us to judge the true value of Chapman's own eloquent description of the ideal physician:[84]

> The soldier who battles with a foe whose Protaean shapes are countless, and whose secret and mysterious influence baffles the scrutiny of the ablest intellects, surely needs, above all others, to be well-equipped, and to be trained to observe accurately, to reason logically, to decide cautiously, and to act promptly. He needs to be at once an able and an acute tactician, to be fortified by an extensive knowledge of physical science, and to command all the resources of his art without being trammelled by such of its traditions as are rendered venerable only by age, or by such of its usages as enlightened experience condemns. But, besides a disciplined intellect, stored with science and skilled in art, the "duly qualified physician" needs especially to be richly gifted with the moral sentiments. The man who walks in the midst of pain and suffering so destitute of feeling as to be untouched by the sight of affliction, or who has so little strength of character that he neither commands obedience nor inspires trust, has mistaken his vocation. In proportion as the wonderful influence of the mind on the body shall be recognised and appreciated, the office of the physician will be exalted, and he will become more and more habituated to track the causes of a large amount of disease into the secret recesses of the soul itself. He will find that his remedies to be successful must too often be applied there. He will feel called upon to succour the weak, to rebuke the self-indulgent, to sympathize with the trouble-stricken, to correct morbid views of life and duty, to cheer the despairing, and, where hope is no longer possible, to smooth the way through the dark valley with such comfort and consolation as only he who is both wise and good can administer. In short, our conception of a physician comprehends a general as well as a special culture of an already fairly gifted nature: and whatever changes in the present system of medical education will most surely result in providing the country with physicians of this order, we shall hail as the real "medical reform."

The man who could write such a passage and attempt to live up to it in his practice was more than a mere nonentity, both as a man and as a physician.

[83] For most of these details see *Notes and Queries*, April 26 and May 17, 1941.

[84] Chapman, *Medical Institutions*, 1870, p. 52.

A CHRONOLOGICAL LIST OF JOHN CHAPMAN'S WRITINGS*

1844

Human nature: a philosophical exposition of the divine institution of reward and punishment which obtains in the physical, intellectual, and moral constitutions of man: with an introductory essay. To which is added a series of ethical observations written during the perusal of the Rev. James Martineau's recent work entitled "Endeavours after the Christian life."

1845

The philosophical and aesthetical letters of Schiller, etc. (with a preface by J. C.).

1847

Characteristics of men of genius: selected chiefly from the *North American Review*. 2 vols.

Brief outlines and review of a work entitled "The principles of nature, her divine revelations, and a voice to mankind. By and through Andrew Jackson Davis." . . . Being the substance of a preface to that work.

1851–4

(Ed.) Chapman's Library for the people. 15 pts. 12mo.

1852

An analytical catalogue of Mr. Chapman's publications [annotated by 'George Eliot'].

Cheap books and how to get them: being a reprint from the *Westminster Review*, April 1853, of the article "The commerce of literature," together with a brief account of the origin and progress of the recent agitation for free trade in books.

A report of the proceedings of a meeting, consisting chiefly of authors, held May 4th at the house of Mr. John Chapman . . . for the purpose of hastening the removal of the trade restrictions on the commerce of literature.

The bookselling system. The following letter was addressed to the editor of "The Athenaeum," who . . . deferred its publication.

1853–4

(Ed.) Chapman's Quarterly Series. 7 vols. 12 mo.

1856

Medical despotism. In *Westminster Review*, April 1856, *65*.

1858

Medical reform. In *Westminster Review*, April 1858, *69*.

Medical education. In *Westminster Review*, July 1858, *70*.

Chloroform and other anaesthetics; how they act, how they kill, and how they may be safely used. Reprinted (with additions) from *Medical Times and Gazette, n.s. 17*. London, Savill and Edwards.

1859

Chloroform and other anaesthetics: their history and use during childbirth. Reprinted from the *Westminster Review, 72*. London, Williams and Norgate.

1860

Christian revivals: their history and natural history. Reprinted from *Westminster Review, 73*. London, George Manwaring.

1863

A new method of treating disease by controlling the circulation of the blood in different parts of the body. In *Medical Times and Gazette*, July 18, 1863.

Functional diseases of women: cases illustrative of a new method of treating them through the agency of the nervous system by means of cold and heat. Also, an appendix containing cases illustrative of a new method of treating epilepsy, paralysis, and diabetes. London, Trübner and Co.

1864

Functional diseases of the stomach. Pt. 1: Sea-sickness, its nature and treatment. London, Trübner and Co.

1865

Diarrhoea and cholera, their origin, proximate cause, and cure, through the agency of the nervous system, by means of ice. London, Trübner and Co. Also: Philadelphia, Lippincott and Co., 1866.

1866

The same; 2nd. edition, enlarged. London, Trübner and Co.

1868

Sea-sickness, and how to prevent it: an explanation of its nature and successful treatment, through the agency of the nervous system, by means of the spinal ice-bag. With an introduction on the general principles of neuro-therapeutics. 2d edition. London, Trübner and Co.

Dr. Chapman's spine-bags.

1870

The medical institutions of the United Kingdom: a history exemplifying the evils of over-legislation. London, J. Churchill and Sons. Reprinted from *Medical Mirror*, 1869–70.

Prostitution: governmental experiments in controlling it. London, Trübner and Co. Reprint from *Westminster Review*, n.s. nos. 89 and 90.

1871

Cases of diarrhoea and cholera treated successfully through the agency of the nervous sys-

* Unless otherwise stated the items are all 8vo and have the imprint London, John Chapman.

tem, chiefly by means of the spinal ice-bag. London, Baillière, Tindall and Cox.

1873

Neuralgia and kindred diseases of the nervous system: their nature, causes, and treatment. Also, a series of cases, preceded by an analytical exposition of them, exemplifying the principles and practice of neuro-dynamic medicine. London, J. and A. Churchill.

1874

Medical charity: its abuses, and how to remedy them. Reprinted from *Westminster Review,* n.s. nos. 89 and 90.

1878

Du traitement névro-dynamique dans certaines maladies des yeux. Paris, P. Asselin. Reprinted from *Recueil d'Ophthalmologie,* Paris, 1878, 5.

1883

Cholera, a disease of the nervous system. (Also) Reviews of Dr. Chapman's work on diarrhoea and cholera (etc.), 2nd. ed., London, J. and A. Churchill, 1866.

The same (French tr.), Paris, G. Masson; pp. 1–8 reprinted from *Journal de Médecine de Paris,* 1883, 5.

1884

The non-contagiousness, causation, and scientific treatment of cholera. In *Westminster Review,* 1884, pp. 472–533. London, Trübner and Co.

1885

Cholera curable; a demonstration of the causes, non-contagiousness, and successful treatment of the disease. London, J. and A. Churchill.

1889

The treatment of epilepsy; principles and practice. Abstract of a paper read to the Medical Society of London, March 18, 1867, and of the ensuing debate upon it. London, Trübner and Co.

1892

L'origine nerveuse des maladies et de leur traitement efficace par l'action directe sur le système nerveux. Une communication faite à l'Académie de Médecine de Paris le 14 juin 1892. Paris, Asselin and Houzeau.

A summary of an essay on the nervous origin of diseases and their successful treatment by acting directly on the nervous system. London, J. and A. Churchill; Paris, Galignani.

"The Doctors' Mob" of 1788

JULES CALVIN LADENHEIM*

"Good friend for Jesus' sake forebear
To dig the dust enclosèd here
Blest be the man that spares these stones
And curst be he that moves my bones."
—Shakespeare

Introduction

THE "Doctors' Mob" of 1788 would be of great historical interest solely from a consideration of the magnitude of the insurrection and the extent of the disorder. Indeed, it is this very viewpoint which prompted Headley[1] to regard it as one of the three greatest riots in American history, ranking with the Stamp Act Riots of 1765 and the Draft Riots of 1864. Of more pertinence to medical history, however, is the great significance of this episode to subsequent medical legislation and scientific development. Without any degree of exaggeration, but more properly with great conservatism, the incident may be said to be to the American medical profession what the Burke-Hare and Ferrari murders were to our English brethren; for as a consequence of this affair, the first practical anatomy laws and licensing regulations came into being—the very foundation, as it were, of the American institutions of medicine.

Historical Background of the Practice of Dissection in the United States

Anatomical studies can hardly be said to have flourished in early Colonial times, and yet we are surprised to learn that as early as the fourth decade of the seventeenth century the practice of "making anatomie" was accorded, if not recognition, at least official cognizance. Although mention of the practice was made in the *Body of Liberties* adopted by the Massachusetts Bay Colony in 1641, there is no proof of actual dissection until 1647, at which time one Giles Formin, a physician and clergyman, was reported to have performed a dissection at Ipswich. Elsewhere in the

* From the surgical (Dr. J. McF. Winfield) and neurosurgical (Dr. T. I. Hoen) services, New York Medical College, Flower and Fifth Avenue Hospitals, New York.

[1] J. T. Headley, *Great riots of New York 1712–1873*, New York, E. B. Treat, 1873, pp. 56–65.

Colonies occasional postmortem examinations, undertaken for the purpose of determining the cause of death, were reported shortly thereafter; for example, in 1670 an autopsy was ordered in the Colony of Maryland by no less a personage than Lord Baltimore to determine the cause of death of a man supposed to have been killed by Indians;[2] and during the height of the Salem witchcraft trials, an autopsy was ordered in the Colony of Massachusetts to ascertain the cause of the death of a man found with diffuse bruises over the surface of his body. Official legal recognition of the necropsy examination within the Colonies did not come until the time of the celebrated episode of the death of Governor Slaughter of New York, to whom it was suspected poison had been administered.[2] Thus, during the century of colonization the American physician's knowledge of anatomy was derived from textbooks, from studies abroad, from prepared mounts imported from Europe, from occasional necropsies, and from amputated limbs. For the medical student of the early eighteenth century, it was a rare day when he enjoyed the good fortune of dissecting a half-picked arm or examining a human heart and lungs.[3]

By 1750 the science of medicine had become sufficiently advanced in the Colonies to make it apparent that the custom of relying on European studies for a knowledge of anatomy, as well as the other limited expedients then employed, was quite impractical. Accordingly the authorities of New York were persuaded to allow the celebrated physicians, John Bard and Peter Middleton, to perform a public dissection of the body and members of one Hermanns Carroll,[4] an executed criminal. So far as can be ascertained, this is the first known American academic course in dissection presented with legal sanction, and its apparent success is attested to by the fact that two years later a similar course was offered to the physicians by one Thomas Wood, who made his announcement in a local newspaper.

The New England surgeons were not far behind in pressing for concessions. In 1774 the legislature of Massachusetts ordered that those who were killed while engaged in duelling were to be delivered up for dissection to certain appointed physicians. We thus note that in Massachusetts, and later elsewhere in the Colonies where the practice of dissection was

[2] J. J. Walsh, *History of medicine in New York*, New York, National American Society, Inc., 1919.

[3] J. B. McMaster, *A history of the people of the United States*, New York, Appleton-Century and Company, 1927.

[4] Claude Heaton, "Body snatching in New York City," *N.Y. St. J. Med.*, Oct. 1943, *43*, 1861–1865. F. C. Waite, "Early development of anatomical laws in New England," *New Engl. J. Med.*, 1945, *233*, 716. Walsh, *op. cit.*

to be legally tolerated, such practices were regarded by the law, not as a scientific pursuit *per se,* but as a superimposed punishment to death itself (following the legal traditions current in England);[4] and although this source managed to provide the profession with an odd number of cadavers, it placed the practice of dissection in an extremely unwholesome light in the eyes of the public.

It is evident that the few cadavers vouchsafed to the physicians by legal provisions of this kind in no way approached the great demands of the day. Indeed, so scarce were dissection subjects that at the Harvard Medical School, which had just been started in 1782, "a single body was made to do duty for a whole course of lectures."[5] It was inevitable, therefore, that there should be recourse to grave robbing,[6] especially in New York City (the seat of Colonial medicine, and the location of the second medical school founded in the Colonies). As early as 1763 a reference appeared at the end of a newspaper account in which is described the mobbing of a Negro accused of rape—"the Body has since been taken up, and likely to become a Raw Head and Bloody Bones, by our Tribe of Dissectors, for the better instruction of our young Practitioners."[7]

In the decade following the inauguration of the anatomy studies in the City of New York by Bard and Middleton, the "Tribe of Dissectors" had made themselves quite thoroughly disliked, for so great was public opposition that Samuel Classy, later professor of anatomy at Columbia College, had early in his career been refused permission to begin his course by the Governor who frankly informed him: "There is no opening for anatomical Lectures. . . . We have so many of the Faculty already destroying his Majesty's good subjects, that in the humour people are, they had rather one half were hanged that are already practicing, than breed a new swarm in addition to the old. You'll say 'tis the way to have abler practitioners, it will help them no doubt; but bad enough (of conscience) are the best we breed here."[7]

From these newspaper accounts one may gather that anatomical studies had from the beginning been viewed with disfavor by large numbers of the people of New York, and we are at liberty to assume that the antipathy increased in direct proportion to the growth of the medical faculty, despite the fact that only scant reference appears in the few extant journals of that day. By far the greatest opposition to the practice came from the poorer

[5] *Massachusetts Sentinel,* Wednesday, April 23, 1778, I, 1. *Boston Gazette,* May 5, 1788. *New York Journal and Daily Patriotic Register,* April 19, 1788; cf. letter to the editor.

[6] McMaster, *op. cit.* (Note 3).

[7] Heaton, *op. cit.* (Note 4).

classes and the Negroes, inasmuch as the principal victims chosen by the grave robbers were those interred in either paupers' graves or the Negro burial grounds,[8] chiefly because large numbers were buried together, frequently without coffins, making the procurement of cadavers infinitely easier. Furthermore, with respect to the fear of apprehension, the punishment would have been considerably more lenient towards the theft of bodies from these cemeteries than from the more fashionable burial grounds.

IMMEDIATE BACKGROUND OF THE RIOT

Two months before the day of the riot, the peace of the city was abruptly disturbed by a lurid report published in the New York *Daily Advertiser* (February 16, 1788) to the effect that: ". . . few blacks are buried, whose bodies are permitted to remain in the grave . . . swine have been devouring the entrails and flesh of women, taken out of a grave, which on account of an alarm, were left behind: . . . human flesh has been taken up along the docks, sewed up in bags; and . . . this horrid practice is pursued to make a merchandise of human bones, more than for the purpose of improvement of anatomy." Whereupon the correspondent concludes (not unreasonably): "If a law was passed, prohibiting the bodies of any other than criminals from being dissected, unless by particular desire of the dying, or the relation of the dead, for the benefits of mankind, a stop might be put to this horrid practice here; and the mind of a very great number of my fellow-liberated, or still enslaved Blacks quieted." (Signature not printed.)

One week later, on the heels of this letter, came the startling report, first printed on February 22d in the *Daily Advertiser,* that the graveyard of the famed Trinity Church had been broken into at night, and a body taken from one of the graves. The irate corporation of the church voted to offer a reward of the (then) fabulous sum of one hundred dollars for information leading to the arrest of the resurrectionists. Heretofore, it would appear that only the common graves were disturbed, but with the entry into the respectable grounds of the first church of the city, grave-robbing took on an even more offensive appearance in the public mind.

In answer to the critical letter, one of the medical students printed a rebuttal[9] to the remarks of a week before, but unfortunately the flavor of

[8] I. Pomerantz, *New York as an American city, 1783–1803,* New York, Columbia University Press, 1938, Vol. I, pp. 401–402.

[9] *Daily Advertiser,* New York, February 23, 1788.

the article was so ludicrously tactless and insulting that the result was more damaging than helpful. It began in this vein: "Great offence, it seems has been given to some very tender and well meaning souls by gentlemen of the medical department, for taking out of the common burying ground of this city bodies that had been interred there; one, in particular, whose philanthropy is truly laudable, has obtained a place for his moving lamentations in your useful paper. . . ." The author then goes on to ridicule his opponent:

> Kind and generous Humanio (for such thy words bespeek thee) thou standest up in defence of the rights and privileges of the dead; and the dead when they recover the use of their tongues, shall gratefully thank thee. . . . And what say the living of humanio: I'll tell thee candidly, my honest fellow, that you are an unfit companion for them; that your head is too empty, and your heart too full; that through your excess of sympathy for the impassive bones of the dead, you have forgot the poor sufferings to which the living world is daily liable. . . .They say you are an inveterate foe to the most useful and necessary branch of human knowledge; and it is even whispered, that you are either the most credulous of fools, or an infamous inventor of falsehoods. For my own part, I take thee to be the most stupid of asses. . . . And to whom would Humanio call for assistance, should he snap his leg or burst a blood vessel? Run, run (he would say) to that barbarous man who has dissected most flesh, and anatomized most bones.
>
> (Signed) A Student of Physic
> Broadway, N. Y.

What effect the response would have had on the later course of events had the medical student taken the pains to offer a tolerant and humane defense, instead of the sophomoric vituperation, one cannot predict; at any event, the repercussions were not slow in appearing. "Humanio," as the irate citizen had been dubbed, reported[10] to the public a few days later that the Negro burial ground had again been entered by a group of medical students who had shamefully and cowardly forced the warden "at the peril of his life, to remain within doors, then went into his yard, took the corpse of a child out of the grave, and attempted that of an aged person. Being asked if they were not ashamed of their conduct, one of them answered that he would think it no crime to drag his grandfather and grandmother out of their graves, or words to that purpose."

Whereupon Humanio concludes on an ominous note:

> You [the editor] will therefore by means of your paper be pleased to warn him [Abductio] and his rash imprudent, inconsiderate companions, that they may not alone suffer abduction of their wealth, but perhaps their lives may be the forfeit of their temerity should they dare to persist in their robberies, especially at unlawful hours of night.

[10] *Daily Advertiser*, New York, February 28, 1788.

The degree of public interest in the grave-robbing affair is attested to by the fact that in the very same issue of the newspaper[10] a second letter to the editor appears about precisely the same subject, the latter from a rather satirical correspondent who, urging that funerals be prohibited by law, goes on to remark:

> As example is more effectual than arguement, in rooting out the prejudices of the vulgar and ignorant, I could wish that Gentlemen of the Faculty (besides continuing to dissect each other) would further lead the way, by dissecting the bodies of the nearest relatives and most intimate friends; by which means the custom would soon become general, and anatomists would acquire such knowledge of the mechanism, that they would be able to take a diseased body to pieces, repair it together again, with the same ease and satiety that the most expert watch maker cleans and repairs a watch.

The author concludes with the suggestion that inasmuch

> . . . as the country is too healthy to admit of much acquaintance with the more acute violent diseases, I would advise the annual importation of the infection of the plague, from the Levant, and Yellow Fever from the West Indies. This would afford the faculty an opportunity of exercising their talents, and making even excellent observations on those diseases.

The following day, February 29th, the *Daily Advertiser* printed another letter, once again critical of the practices of the grave robbers, written by what appears to be a rather enlightened member of the community who, after criticizing the tactlessness of Abductio (for so the medical student had been dubbed), wrote: "I have had recourse to the opinion of several eminent anatomists, Who have all assured me, that three subjects, in the hands of a skillful operator, are amply sufficient for a course of lectures during a season; and that, in the hands of the unskilled, ten-thousand cannot be of no manner of use."

These desecrations and the assurance of public support prompted the free Negroes, who as stated above were chiefly (but not exclusively) the targets of the Resurrectionists' excursions, to petition the Common Council of New York[11] to curb students by stricter enforcement of the provisions of the law. While assuring the magistrates that they were "well-aware of the necessity of physicians and surgeions consulting dead subjects for the benefit of mankind," and that they did not object to dissection "where conducted with the decency and propriety which the solomenity of such an occasion requires," they nevertheless expressed their grievance at the sacrilege against their burial grounds, and the corpses interred therein, which the anatomists were accustomed to carry away, and "with-

[11] *Stokes iconography of Manhattan Island,* VI, p. 46, quotes the filed papers in the City Record Room; Petitions; 1700–1795.

out respect to age or sex, mangle their flesh out of a wanton curiosity, and then expose it to Beasts and Birds."

Clinical and dissecting facilities in New York at this time were as impoverished as the supply of cadavers. In common with the other early American cities, no provision had been made prior to the middle of the eighteenth century for the care of the sick and injured. In fact, the development of the hospital in New York City was particularly retarded. Not until five years before the outbreak of the Revolutionary war was the Society of the Hospital of the City of New York founded, which somewhat belatedly erected a building two years later on the west side of Broadway between what were then Duane and Catherine Streets. By 1775 this building was completed only to be wrecked by fire a few months after its completion. During the hostilities it was used as a barracks and, after the war, as a refuge for poor Scottish immigrants.[12] However, although the building was not employed exclusively for the purpose for which it was erected,[13] a laboratory was provided for the use of medical students and physicians, and it was in the environs of this laboratory in the second week of April, 1788, that the famous Doctors' Riot began.

The Riot

Sunday, April 13. At three o'clock in the afternoon a group of small boys were reported to have been playing outside the hospital in which, as it chanced, several medical students or several physicians—the records are not clear—and at least one instructor were dissecting a cadaver.[14] Led by curiosity, one of the boys, the son of a mason, placed a ladder which had been lying nearby against the side of the hospital wall and proceeded to climb up to the window of the laboratory, to the amusement or irritation of the dissectors present inside the laboratory who had noticed the curious face. At this point the available accounts of the incident differ greatly. Some chronicles report that one of the anatomists chanced to hold the arm out on a line to dry;[15] other reports state that the dissector waved the arm at the child to frighten him off; while still others maintain that the dissector held up the arm to the child's face and told him that it was the arm of his mother.[16] It apparently so happened that the boy's mother had recently passed away, so, if the latter account be true, the effect upon the

[12] Pomerantz, *op. cit.* (Note 8), p. 350.

[13] Lamb, *History of City of New York*, II, pp. 306–307; in fact, it was not until 1791 that the building was used exclusively as a hospital.

[14] *Massachusetts Sentinel*, Wednesday, April 23, 1788, IX, 11.

[15] *Boston Gazette*, May 5, 1788.

[16] Headley, *op. cit.* (Note 1), pp. 56–65.

child might well be imagined. This much is known; the lad fled in terror and sought out his father, who, at this time, was engaged in masonry along what was then Broadway. The father, surrounded by a group of friends, is said to have visited the grave of the recently deceased where, to his horror, he discovered that the casket had been opened and the body was no longer in it.[17] Quickly returning to his fellow laborers, the man gathered a party of workmen who armed themselves with the tools of their trade and in ever increasing numbers[18] advanced to the hospital, made their way into the south wing, which was entered without difficulty, and broke into the dissecting rooms. The sight which greeted them kindled their fury.[19] Finding several incompletely dissected bodies, the mob could not be restrained; and they "seized upon the fragments, heads, legs and arms, and exposed them from the windows and doors to public view, with horrid imprecations."[20] This done, they proceeded to "rifle the rooms" and "destroy the books, skeletons,"[21] etc. Several more conservative reports mention only the discovery of preserved anatomical preparations; but most of the accounts agree that some "fresh subjects were found"[22] which, they state, were quickly "heaped into carts and carried forth" with reverence by the mob to be "enterred the same evening in triumph."[23]

In any event, the rage of the mob, now confronted with this indisputable *prima facie* evidence, increased with each fresh act of destruction which it committed on the hospital premises. Detachments of rioters were dispatched to capture the physicians who were present at the hospital. The imbecilic physician, Hicks by name, who is said to have precipitated this affair, somehow managed to escape; but his four companions were so luckless as to fall into the hands of the rioters and would most assuredly have suffered great physical harm, possibly death, had they not at this time been rescued by the Mayor, the sheriff, and several other prominent men who, informed of the disturbance, had quickly and fortunately appeared on the scene, and somehow managed to rescue the physicians by presenting them with writs of *mittimus,*[24] lodging the luckless doctors in jail for

[17] *Ibid.*

[18] *Massachusetts Sentinel,* Wednesday, April 23, 1788, IX, 11; April 26, 1788; reports vary as to the numbers of the rioters, some relating as few as 400, others as many as 5000. The consensus favors the higher figure.

[19] *New York Packet,* Tuesday, April 15, 1788.

[20] J. Thacher, *American medical biography,* Boston, Richardson & Lord and Cottons & Barnard, 1828, p. 52.

[21] *Massachusetts Sentinel,* April 23, 1788, IX, 11.

[22] *Boston Gazette,* May 5, 1788.

[23] M. L. Booth, *History of the City of New York,* New York, Clark and Company, 1859, pp. 582–586.

[24] *Massachusetts Sentinel,* April 23, 1788, IX, 11.

the evening. To this intelligent action on the part of the city officials the four physicians owed their lives, for so disturbed was the feeling of the rioters that even among the party of distinguished citizens, "several . . . received blows, much abuse and insult."[25] Following the incarceration of the physicians, the crowd slowly dispersed, with nasty threats and much commotion. "The friends to good order"[26] returned to their homes, hoping the affair had been ended. Thus passed the first day of the disorder.

Monday, April 14. If the Mayor's party had seriously believed that the incident had ended, they were shortly to suffer great disappointment. Early the following morning a crowd collected in front of the hospital, determined, in addition to other mischief, "to search the houses of the suspected physicians"[27] for evidence similar to what had been found on the hospital premises. The despicable Dr. Hicks, who is said[28] to have been the physician who waved the arm before the boy's face and who had miraculously escaped capture the day before, fled, at the reports of the mob's approach, to the residence opposite Trinity Church of Dr. Cochran, a man held in great respect. But the rioters apparently learned of his hiding place and sought him out at the Cochran dwelling which they searched from cellar to garret with no success. So intent were they on finding him that "they even opened the scuttle and looked out upon the roof" without perceiving the terrified Hicks who lay hidden behind the chimney of an adjoining house, "suffering probably under a more violent scidoufie than he ever ventured to administer to a patient."[29]

Governor Clinton, Mayor Duane, and the Chancellor, apprised of the gravity of the situation, formed a party and, marching up Broadway, met the mob with a sincere appeal to "refrain from . . . unnecessary depradations." They addressed the people "pathetically" and promised them "every satisfaction which the laws of the country can give."[30] This forthright appeal is said to have had a considerable effect on many "who left peacefully with the Mayor's assurance." Others remained and, reforming their ranks, proceeded to advance in a large body to Columbia College where, to the amazement of the professors and student body, the innundation "swarmed without opposition throughout every part of the building,"[31] but, "finding nothing to confirm their suspicion, they left without doing any material injury." Many, however, still chose to remain in ranks, and, directing their attention to the persons and property of

[25] *New York Packet*, Tuesday, April 15, 1788.
[26] *Boston Gazette*, May 5, 1788.
[27] Duer, *New York as it was*, New York, Stanford and Swords, 1849, pp. 20–22.
[28] *Boston Gazette*, May 5, 1788.
[29] Duer, *op. cit.*
[30] *Boston Gazette*, May 5, 1788.
[31] Headley, *op. cit.* (Note 1).

the physicians and surgeons,[32] decided to conduct a systematic search of their homes, appointing a delegation to search the property for cadavers. In this activity, we are told, the crowd was extremely well behaved, and it is said to have "received the report of the self-constituted committee with apparently perfect satisfaction, and when they had made the rounds of the houses"—without apparent success—"they gradually broke up into knots, and dispersed."[33] One report stated that before the morning was over, they had visited "every physician's house in town."[34] The Mayor and Governor had remained in the company of the mob, continuously urging them to restrain their actions.[35] Some accounts are not in agreement concerning the passivity of the crowd during this hectic morning. The correspondent of the *Pennsylvania Journal* stated that before afternoon they had "besieged the city, visited the doctors, destroyed their furniture, shops, etc."[36] But, by and large, most witnesses agree that the mob had been reasonably orderly up until this time.

The afternoon brought an entirely different state of affairs. A large crowd numbering three to four hundred assembled in front of the jail in which the anatomists were lodged and filled the air with shouts of "Bring out your doctors! Bring out your doctors!"[37] The fracas was sufficiently threatening to convince the authorities that the disturbance should be met with a show of force. Inasmuch as the city in those days did not possess a police force sufficient to cope with the situation, a small military force was hastily organized by three o'clock in the afternoon and timidly made its way up Broadway in the direction of the disturbance. This detachment, numbering eighteen men, was evidently "intended only for intimidation,"[38] for the mob permitted them to pass, through curiosity or amusement more than fear. Instead of taking up positions near the jail to restore order, the detachment marched away (possibly because they realized the inadequacy of their numbers), "with no other insult than a few vollies of stones, dirt, etc."[39] This failure on the part of the city authorities to gain and maintain an early advantage was, as will be seen, a fatal error.

A half hour later another party of about twelve men made a similar effort to pass through the mob and advance towards the jail, but this time the mob did not permit them to enter the jail grounds. Meanwhile the temper of the mob had been slowly changing, and the second luckless

[32] *Massachusetts Sentinel*, Wednesday, April 23, 1788.
[33] Headley, *op. cit.*
[34] *Boston Gazette*, April 28, 1788.
[35] *Massachusetts Sentinel*, April 26, 1788.
[36] *Pennsylvania Journal*, April 23, 1788.
[37] Headley, *op. cit.* (Note 1).
[38] *Ibid.*
[39] *Boston Gazette*, May 5, 1788.

detachment, "having no orders to resist," were quickly surrounded by the rioters who "seized and destroyed their arms." As one account depicts the episode, "instead of waiting for them to come near, they rushed from the street to meet them, and swarming like bees around them, snatched away their muskets, and broke them to pieces on the pavement." The soldiers, if such they were, fled in full retreat, "disarmed, scattered and hustled about . . . glad to escape with whole bodies."[40]

Then the storm broke. Amid shouts of "To the jail!" the crowd, numbering by this time almost five thousand, attempted to force an entrance into the jail and, rushing against the doors, vainly attempted without success to unhinge them. Nor could they force an entrance through the windows, for they were repulsed by the people inside "with all the weapons at their command."[41] "The rioters hurled paving stones and bricks, but the moment they advanced [to the windows] they were beaten back by sticks." Every picket fence within blocks of the jail was destroyed to provide weapons for the mob. Great as the commotion was, however, up until this time no lives had been lost on either side "except one, who entered at one of the broken windows into the room and was killed by the soldiers with the bayonet."[42]

By this time it had become apparent to the Mayor that only a display of force could put an end to this violence and that the jail, if unrelieved, would of a certainty be successfully stormed, releasing a dangerously large number of criminals, in addition to exposing the incarcerated physicians to certain death. It thus appeared necessary to raise a large party of experienced military men to disperse the crowd. Accordingly, the governor[43] was persuaded to order out all available militiamen; but "as they were most of them with the mob, but fifty could be collected with firearms,"[44] of whom the largest number were drawn from the officers of Stokes' Light Horse Regiment. Many gentlemen of high station joined the ranks, armed with swords and clubs. The leaders of the band were Governor Clinton, General Malcolm, and Mayor Duane, and numbered among their distinguished colleagues the famous statesmen John Jay, Alexander Hamilton,[45] and no less a military personage than Baron von Steuben. By the time the military detachment had collected, night had fallen and one account describes their advance in colorful terms:[46] "In the dim starlight

[40] Headley, *op. cit.*

[41] *Ibid.*

[42] *Public papers of George Clinton*, Vol. 1, p. 184. *Massachusetts Sentinel*, April 26, 1788.

[43] Public Papers, *op. cit.*

[44] *Massachusetts Sentinel*, April 26, 1788.

[45] Lamb, *op. cit.* (Note 13); apparently Jay was wounded by a brick thrown through the glass of his carriage as he was proceeding towards the scene of the riot.

[46] Headley, *op. cit.* (Note 1).

their bayonets were seen gleaming, as they marched steadily forward in the dark, heaving mass that filled the street as far as the eye could see."

The company approached the waiting mob which desisted from violence until the soldiers were "within ten paces of the door" of the jail. Then, believing that the militia were under orders either not to fire, or to fire over their heads, the mob commenced to "throw brickbats, stones, and sticks."[47] Jay was knocked down,[48] seriously injured by a blow to his head, as were Commander Nicholson and Mayor Duane. "Indeed, almost every man that entered was wounded—the first two very seriously."[49] Baron von Steuben was "struck by a stone, which knocked him down, inflicted a flesh wound upon his forehead and wrought a sudden change in his compassionate feeling he had previously entertained towards the rabble."[50] At the moment at which he received the blow "he was earnestly remonstrating with Governor Clinton against ordering the militia to fire; but as soon as he was hit, his benevolence deserted him, and as he fell, he lustily cried out, 'Fire, Governor, fire'!"[51] The commanding officer needed no second invitation. The command "Ready, aim, fire!" was given; and a broad flash followed, lighting up the gloom of night or, as one account states, "revealing the scowling faces of the mob, the battered front of the jail, and the pale faces of those guarding the windows."[52] To the previously confident mob which had expected no such resistance, the volley came as a thunderbolt, killing and wounding eight rioters.[53] The commanding officer, however, understood his business; for instead of waiting to see the effect the volley produced, he ordered another round. The effect may well be imagined. "The rioters were confused as they saw their comrades fall by their sides, but still stood at bay" in hopeless bewilderment. Finally realizing that the firearms were discharged, they began to crowd in, forcing the group to retreat, a deployment necessitated in addition by the fact that the force holding the jailyard had also begun to fire on the mob in the direction in which the soldiers were advancing, exposing the militia to danger of being hit[54] by their own fire.[55] The militia then fixed bayonets and held off the mob with a loss of three men,[56] while they

[47] *Massachusetts Sentinel,* April 26, 1788.

[48] *Pennsylvania Gazette,* April 23, 1788.

[49] *Massachusetts Sentinel,* April 26, 1788.

[50] Duer, *op. cit.* (Note 27). The wounds of Jay and von Steuben proved sufficiently severe to necessitate their remaining in bed ten days according to the information received by Thomas Jefferson: *Writings of Thomas Jefferson,* London, New York, Derby and Jackson, 1859, Vol. II, p. 397.

[51] R. W. Griswald, *The Republican court,* New York, 1854, p. 102; the biographer of Baron von Steuben states that the General was *accidentally* injured (F. Knapp, *Life of Frederick Wilhelm von Steuben,* 1859).

[52] Headley, *op. cit.* (Note 1).

[53] Lamb, *op. cit.* (Note 13).

[54] *Massachusetts Sentinel,* April 26, 1788.

[55] Duer, *op. cit.* (Note 50).

[56] *Boston Gazette,* May 5, 1788.

continued to fall back with the rioters on their heels until they reached St. Paul's Church; there they again charged the crowd, some of whom retreated "into the Church yard, driven sword in hand through the portico, by the troopers striking right and left with the backs of their sabers."[57] Here the small detachment broke its ranks, weary with the excitement of the evening. Some reports state that the rioters had crushed the militia, forcing them to disperse.[58] Whatever the degree of truth present in this description, it is clear that the militia's main objective had been attained, in that the jail was not taken.

While this insurrection had been transpiring in front of the jail, bands of rioters elsewhere in the city had been terrorizing the medical profession, threatening, in the words of one eyewitness "a general Hegira of physicians."[59] The medical students were secretly stowed into carriages and hurried off to the country where they remained until the excitement abated. To escape the awful visitation of the mob, physicians were forced to "slip out of windows, creep behind bean barrels, crawl up chimnies, and hide beneath feather beds,[60] and the grave gentlemen of the healing art were forced to flee in dark places like haunted rebels or persecuted prophets for three days and three nights." Lamb recalls that the mob even attacked the home of the distinguished Sir John Temple, mistaking the name of Sir John for surgeon, and with the greatest difficulty "were just barely restrained from leveling it to the ground."[61]

Several traditions have come down to us concerning the bravery displayed by the physicians of that day.[62] Of the great American physician and founder of Columbia's College of Physicians and Surgeons, Samuel Bard, we learn that in the hour of crisis, when his brethren were migrating to more salutary climes, "he resisted the most urgent solicitations to flee or conceal himself; but as the infuriated mob approached his house, ordered the doors and windows to be thrown open and placed himself in full view of them as they drew near." Struck with the sincerity and bravery of his actions, they allowed Professor Bard to remain unmolested. Strangely enough, moreover, the apartments of Mr. Post, the proprietor of a private anatomy museum and a private anatomical lecturer were likewise completely spared.[63] The mob, in the early hours of the riot, on entering the rooms, were said to have been struck by its scholarly appearance, and were

[57] Headley, *op. cit.* (Note 1).

[58] *Pennsylvania Journal,* April 23, 1788. The correspondent to the *Massachusetts Sentinel* describes the soldiers as being routed at the Church, which, in all probability, was true.

[59] Headley, *op. cit.*

[60] Griswald, *op. cit.* (Note 51).

[61] Lamb, *op. cit.* (Note 13).

[62] Thacher, *op. cit.* (Note 20).

[63] *Daily Advertiser,* New York, April 26, 1788.

persuaded to leave the preparations unmolested.[64] Most of the physicians of New York, however, did not meet with similar good fortune.

Thursday, April 15. The success of the previous evening's military junta convinced the authorities that the military victory could be maintained solely by continuing the show of force. Accordingly, orders were sent out in the early hours of the morning to the surrounding country for the militia to form and march into the city. Two detachments are known to have responded, that of General Malcolm's brigade and Colonel Bauman's regiment of artillery.[65] The size of these two units was sufficient to dissuade even the most belligerent from concerted mischief. But the city remained alive with excitement. On every corner small groups of excited men discussed the preceding day's events, with great exaggerations of the numbers of dead. Droves of people visited the scene of the previous evening's turmoil, stopping to gaze in horror in front of the jail at the blood-stained pavement.[66] The soldiers stationed outside the jail were cursed, but "they quietly rested on their arms ready to repeat the experiment at the first open act of violence."[67] A parade was held later in the day with the detachments marching in full force.[68] It thus became apparent to the citizenry that the military were in full possession of the means for maintaining order, should there be any recurrence of the rioting. Fortunately, there was no recurrence.

Aftermath. The terror experienced by the physicians of New York City during these turbulent three days can well be imagined. As stated above, many hastened to the country, others remained boarded up in their homes waiting for the axe to fall, while still others sought refuge in the homes of their lay friends.[69] But it is remarkable, in reviewing the record of the riots, to note that there is no evidence of a single physician losing his life. This does not detract from the intensity of the mob's feelings; for had a luckless physician fallen into their hands, the severest consequences could well have been predicted, and the absence of any fatality was in all probability due to the physicians' success in evading capture.

So high did public sentiment run that newspapers found it expedient to omit the perennial medical advertisements for many days after the riot, lest the public be reminded. Two days following the termination of the riot, many physicians known to be, or suspected of being, implicated in the practice of dissection, took the pains to disavow any connection with

[64] *Ibid.*, April 23, 1788.
[65] *Boston Gazette*, May 5, 1788.
[66] Headley, *op. cit.* (Note 1).
[67] Headley, *op. cit.*
[68] *Massachusetts Sentinel*, April 26, 1788.
[69] Griswald, *op. cit.* (Note 51).

the cemetery desecrations. Dr. Richard Bayley,[70] described in the *New York Packet* as "solicitous to preserve the good opinion of his fellow citizens," announced his willingness to submit his conduct to candid and impartial examinations. In a sworn statement printed in many of the newspapers of the City, this physician stated:[71]

> . . . that he hath not, directly or indirectly, had any agency or concern whatsoever, in removing the bodies of any person or persons enterred in any churchyard, or cemetary, belonging to any place of public worship in the saith city, and that he hath not offered any sum of money to procure any human body so interred, for the purposes of dissection. . . .

The same day similar statements appeared in *The New-York Journal, and Daily Patriotic Register* by Ebenezer Graham, John Parker, George Gilesby, John Hicks, Charles McKnight,[72] and Richard Bayley.

John Hicks, for example, caused to be published a statement[73, 74] denying that he

> . . . had any agency or concern in removing or dissecting the bodies of any person or persons, whatsoever; and that he had not been within the wall of the hospital in this city, since the year 1783, until Sunday last by mere accident, on account of a large number of people having collected at the said hospital. . . .

This was the same Hicks who, it will be recalled, had precipitated the riot by imprudently waving the arm, or hanging it out to dry, as the different accounts picture him. In any event, whatever might have been his actions the day before, we can well understand the concern which prompted him to assert:

> This subscriber, who now, in an advanced year of life, flatters himself he had ever been an unimpeachable character feeling wounded by some groundless reports and ungenerous insinuations lately made to prejudice the minds of his fellow citizens against him, is induced thus publically to invite any person to lay the pretended charges of improperly or inhumanly . . . before the Grand Jury, on oath, that he (the subscriber) may then know in what manner to vindicate himself. In the meantime he requests all persons of candor and humanity to disregard ill-natured misrepresentations of talks invented by nature; declares that the causes of the late unhappy tumult in this city, so far from being in any degree imputable to him, and are held by him in the utmost detestation and abhorrence.

[70] Richard Bayley (1745–1811) studied in London with John Hunter, and was known in the annals of American medical history as the Health Officer of the Port of New York, during whose administration the first quarantine laws were passed.

[71] *New-York Journal and Daily Patriotic Register*, April 15, 1788. *Daily Advertiser*, New York, April 15, 1788. *New York Packet*, April 18, 1788.

[72] F. R. Packard, *History of medicine in the United States*, New York, P. B. Hoeber, 1931, Vol. I, p. 237. W. G. Eliot, *Portraits of noted physicians of the New York 1750–1900*, American Biographical Society, Vol. 1.

[73] *Daily Advertiser*, New York, April 16, 1788.

[74] *Daily Advertiser*, April 19, 1788.

In the case of Charles McKnight,[75] known by the public to be a professor of anatomy and therefore a dissector, the refutation took a somewhat different turn. This gentleman's statement, sworn "upon the Holy Evangelist of Almighty God" states[76] that:

> . . . he hath not been concerned, privy to, or promoted the removal of any dead bodies from any church yard within the city, and that he hath not encouraged any such practice.

To substantiate this statement, a declaration[76] was appended to his sworn notice, signed by three of his students, Ebenezer Graham, John Parker, and George Gillesby, to the effect that

> . . . they never have received any direction from Dr. McKnight in the use of his profession, as a physician and surgeon than what hath appeared to them to have been perfectly proper; and that they nor either of them, have never been concerned in the removal of any dead bodies, from any churchyard, or other burying-place *within the city* [italics ours].

It is interesting and profitable to note that the sworn statements make repeated use of the expression "within the city," which certainly prompts the query as to whether these gentlemen would have been as willing to swear that they had not been instrumental in securing cadavers *beyond* the boundaries of the city.

The legal aspects of the riot are of sufficient interest to merit a brief discussion. It may be recalled that the disorder took place prior to the adoption of the Constitution of the United States, at a time when there was neither a central government nor a sufficiently developed statute law. Unquestionably the fluidity of the central government encouraged grave doubts as to the ability of the local city government to provide for punishment in such a widespread disorder. Thus it is by no means coincidental that in the charge to the Grand Jury of the City of New York summoned to investigate the disorder, Chief Justice Morris made a deliberate point of expressing the reminder "that our laws are competent to punish any degree of guilt." Of additional significance is the fact that this statement was singled out and reprinted in many newspapers,[77] both within and without the Colony of New York, as a reminder that however large the

[75] Charles McKnight (1750–1791), studied with Shippen in Philadelphia, and was noted for his studies in extra-uterine pregnancy. *Daily Advertiser,* April 19, 1788.

[76] *Daily Advertiser,* April 16, 1788.

[77] *Independent Gazetteer,* Philadelphia, April 21, 1788. *Pennsylvania Gazette,* April 23, 1788. *Independent Journal: or, the General Advertiser,* New York, April 16, 1788. *Brunswick Gazette and Weekly Monitor,* New Jersey, April 22, 1788. *Daily Advertiser,* New York, April 17, 1788. *New York Packet,* April 18, 1788. *Pennsylvania Journal,* April 23, 1788.

disturbance, the common laws and statute laws, indefinite as they were, could still be relied upon to provide for the punishment of all offenders.

Furthermore, inasmuch as the riots took place at a time when the delegates of the Colonies were assembled in Philadelphia for the purpose of drafting the Constitution, there can be no doubt that the furor of the recent events aroused grave misapprehensions in the minds of many as to the wisdom of entrusting the government to the hands of an unselected body of people which in their opinion could be equated with the "mob." It is this fear which led the *Daily Advertiser* to remark:[78]

> If there should be no subordination or obedience, and no energy or public virtue to vindicate and maintain rightful authority what would avail the high privileges, for which, at every hazard, we have successfully contended: What the best constitution, or the most excellent system of laws, though administered with the utmost purity? If on every gust of passion, individuals should be suffered to recur to acts of riot and revenge, all the blessings we enjoy must become precarious; every man in his turn might fall a victim to blind rage, and innocence itself, as we have lately seen, afford no protection . . .

Thomas Jefferson, on a visit to Paris for the purpose of securing recognition and financial aid for the new nation, was alarmed on receiving a grossly distorted account of the affair and felt called upon to write to a friend that the riot had no political implications, for in Europe the episode "may be represented as a political riot, when politics had nothing to do with it."[79]

But if misapprehension existed among the citizens of New York as to the efficacy of the legal process in the interim government of that city, the subsequent course of events was soon to dispel it. Within two days after the termination of the riot, a grand jury was summoned,[80] headed by one Thomas Ivers, and was charged by the Mayor, the record of which, as in the case of the Chief Justice's remarks, was reprinted in many newspapers throughout the East in view of the grave significance of the riot.[81] Noting that the city "since the restoration of the peace hath been eminently distinguished for order and tranquility; a blessing which can only accompany reverence for the laws," the charge warned that "those who gave the provocation have much to answer for," and that ". . . their misconduct cannot be palliated by alleging that it was necessary as a means of improvement in a useful science. . . ." The address went on to describe the reverence in which the dead should be held, and the cruelty of any attempt to interfere

[78] *Daily Advertiser*, New York, May 10, 1788.

[79] *Writings of Thomas Jefferson*, New York, Derby and Jackson, 1859, Vol. II, p. 297.

[80] *Brunswick Gazette and Weekly Monitor*, New Jersey, April 22, 1788.

[81] *Daily Advertiser*, New York, May 10, 1788.

with their sanctity. However, it noted that the blame did not exclusively rest upon the medical profession, for:

> . . . by rushing into riot and violence, and obstinately persisting to the last extremity, even to occasion the shedding of blood, they [the rioters] have committed an offence, far more serious and alarming than that of which they complained; an offence striking at the very foundation of all government and security. To every civilized country, such an event would be a reproach, but how much more so to a land of liberty, where all power and offence are derived from the people themselves . . . and not the will of the ruler is supreme; and where it is emphatically the government of the very people who attempt to destroy its influence and render it contemptible.

In general, the editorial comment concerning this episode was unequivocal in its denunciation both of the ruffians who fanned the flames of the riot, resorting to all kinds of felony during the course of the riot, and those physicians who had shamefully given the public cause for this violence.[82] New York, like most seaports at this time, was filled with strangers of every description who, devoid of responsibility, were most active in creating mischief. However, no pretense was made that the bulk of the mob was recruited from other than the ranks of the citizenry. Moreover, aside from the nature of the rioting body, editorial comment recognized the need for more thorough penal laws:

> It generally happens after a revolution, or when a body of people agree, from being in a state of nature, in entering into a compact society and to form and institute a government; that there will be evil disposed persons among the community, who being ignorant of, or opposed to the eternal laws of justice and equity, will, for the sake of private advantage and an aversion to all government, disturb the happiness of society by committing enormities, from the punishment of which they judge themselves secured as not being repugnant to any human written laws, than is being in that society. Hence proceeds the necessity of continually multiplying penal laws in new established governments and the duty of rulers as soon as possible to pass all laws necessary for the security of life, liberty, and immutable obligation to God and love to man.

In addition to the above comment many journals were quick to utter "well deserved" to the description of the insults levelled at the medical profession. *The Independent Gazetteer* of Philadelphia in calling for the restoration of order, states that "the cause of humanity is revenged already—the aggressors are humbled."[83] The *New York Journal* and *Daily Patriotic Register* were somewhat more bitter in their denunciation: ". . . the conduct of some physicians, in this city, has for many months past made such deep impressions upon the public mind, and so harrowed up the feelings

[82] *Pennsylvania Journal*, April 23, 1788. *New-York Journal and Daily Patriotic Register*, April 19, 1788.

[83] *Independent Gazetteer*, Philadelphia, April 23, 1788.

of the people, that the present violent proceedings are no matter of surprise, but have been actually expected and foretold by many who were acquainted with the cause, and could easily prognosticate the consequence. . . ."

In general, then, it must be noted that the medical profession emerged from this affair with tainted banner. As the distinguished historian Pomerantz observes, "Violating the sanctity of the dead had proved to be a costly business, and it was a long time before the medical men of New York regained their badly shattered prestige."[84] To be sure, the profession continued to attempt to persuade the public that the source of cadavers was drawn solely from condemned prisoners, Negroes, and cemeteries far beyond the city limits,[85] but that their words went unheeded was attested to by the fact that in the week immediately following the riot, droves of people flocked to the cemeteries to inspect the graves of their loved ones.[86]

The city administrators, as might be expected, were quick to mend the stable door once the horse was gone. Compelled by the recent evidence of weakness on the part of the law-administrative agencies, they ordered the jail repaired and the number of jailers to be increased by sixteen,[87] possibly in anticipation of housing a large number whom it was suspected that the grand jury would indict.

If such had been their expectation, they must have suffered grave disappointment, for there is no record of any convictions being sustained; apparently the men who appeared on the Sheriff's calendar were released. Ten days after the first hour of the riot, the ubiquitous medical advertisements, which had been suspended from publication during the incident, reappeared,[88] and by this signal token, the tumult was then considered to be at an end;[89] but for a long time afterwards there were scattered reports of armed groups, "Dead Guard Men," being formed to continue the holy work of protecting the graves of the dead.[90]

For the physician the only consolation was in the passage of the anatomy laws by the state legislature. Very shortly after the reassembly of the

[84] Pomerantz, *op. cit.* (Note 8), pp. 401–402. As for the doctors implicated in the riots, they were dismissed from the staff of the hospital and a fine of 22 pounds, 7 shillings, 10 pence leveled against them by the board of governors. Packard, *op. cit.* (Note 72), p. 237.

[85] *Daily Advertiser,* New York, April 26, 1788.

[86] *Boston Gazette,* May 5, 1788. An amusing account is presented in this journal of an officer in the foot dragoons who asked that he be buried in full garb and accoutrement, determined to protect himself to the end.

[87] *Minutes of the Common Council of the City of New York, 1784–1931,* New York, 1917, p. 364.

[88] R. G. Victor, "An indictment for grave robbing," *Ann. med. Hist.,* September 1940, *3d ser. 2,* 366–370.

[89] *Daily Advertiser,* New York, April 22, 1788. An advertisement of John Casper Rubel declaring the merit of a certain universal pill for the cure of the following diseases, etc.

[90] Headley, *op. cit.* (Note 1). Nevertheless the military detachments were stationed in front of the jail for many days after the turmoil had subsided.

12th Session, a bill[91] entitled "An Act to Prevent the Odious Practice of Digging Up and Removing for the Purpose of Dissection, Dead Bodies Enterred in Cemeteries or Burial Places," was introduced into the Senate of the State of New York, referred to the Committee of the Whole, and subsequently read at three different sittings and passed;[92] whereupon it was referred to the State Assembly for similar treatment.[93] An idea of the pressing need for this piece of legislation may be gathered from the prominent place it held on the agenda for the 12th Session, for in fact it was the first important law enacted during that session. By the terms of the enactment,[94] "any person who shall at any time hereafter for the purpose of dissection, or with intent to dissect, dig up, remove or carry away, or be aiding or assisting in digging up, removing or carrying away, any dead human body . . . shall be judged to stand in the pillary or to suffer other corporal punishment (not extending to life or limb); and shall also pay such fine, and suffer such imprisonment, as the court before whom such conviction was held, shall . . . think proper to direct."

But in order not to discourage scientific endeavor, it was further provided that the justices of the Supreme Court or any court of oyer and terminer or jail delivery could add to the judgment of death for a murderer, arsonist, or burglar, "that the body of such offender shall be delivered to a surgeon for dissection; and the sheriff who is to cause such offense to be executed, shall, accordingly, deliver the body of such offender, after execution done, to such surgeon as such court shall direct; provided always that such surgeon or some other person by him appointed for the purpose, shall attend to receive and take away the dead body, at the time of the execution of such offender." Thus with the passage of this bill, not only was dissection legally authorized, but incomparably more adequate legal provision was made for a supply of cadavers.

Nor was this the only legal consequence, for it must be incidentally mentioned that the lack of integrity displayed by many physicians in the years preceding the riot prompted the legislature to formulate one of the earliest codes of licensure for the medical profession in the colonies. Thus, as a direct consequence of this lamentable affair,[95] the legislature at the next session passed a law requiring an apprenticeship with a respectable physi-

[91] *Laws of New York*, Albany, Weed Parsons and Company, 1887, Vol. II, p. 5, Chap. 3: 12th Session.

[92] *New York State Assembly Journal*, Friday, March 19, 1790.

[93] *Journal of the Assembly of New York*, Monday, December 29, 1788.

[94] *Laws of New York, op. cit.*, Chap. 3: 12th Session.

[95] *Ibid.*, Chap. 37; 15th Session.

cian or two years of medical school in addition to a vigorous examination by high government officials.

These, then, are the events leading up to the passage of the important Anatomy Acts of 1789. It must not be assumed, however, that the meager provisions satisfied the requirements of the ever-expanding medical faculties in New York City. For example, Dr. Samuel France in his later years was fond of recalling how students and preceptors in the early nineteenth century were accustomed to journey to Long Island in quest of cadavers, evading the armed parents and friends who watched the wagons crossing the ferry.[96] As eminent a surgeon as Dr. Valentine Mott recalled in the middle of the nineteenth century a vivid description of a visit to Potter's Field in the years following the great riot for the purpose of acquiring dissecting material.[96] Indeed, it is said that every one of the first half-dozen presidents of the New York Academy of Medicine confessed at some time to having taken part in body snatching either in his student days or in the early years of practice.[96]

In conclusion (and somewhat parenthetically), we are prompted to note that there appears to prevail today among the junior members of the medical profession a note of growing disdain for the early medical history of the United States—if, indeed, this lack of interest is limited to American medical history alone. The belief has gained widespread credence in certain quarters that prior to the discovery of the newer chemotherapeutic agents the profession was in a state of fraud and that its chronicle, if not a waste of time, is at least a weary imposition. So great a challenge cannot be met in this brief article, but we hope to have presented a glimpse of the almost insurmountable difficulties under which our professional predecessors frequently labored in their honest efforts to gain the knowledge necessary for the intelligent practice of their art.

The student who can read of these heroic tribulations and walk into the dissecting room without at least a kind thought for those venerable "milestones, set by his fathers before him," must indeed appear an ungrateful offspring.

Acknowledgment

The author wishes to thank Miss Margaret Brinton, Dr. Paul Sullivan, and Mme. Guy d'Anselm for their kind assistance.

[96] Walsh, *op. cit.* (Note 2).

Francis Clifton and William Black Eighteenth Century Critical Historians of Medicine

MAX NEUBURGER*

MEDICAL historians are accustomed to characterize the eighteenth century by formalism, calling it the age of medical systems and theories which made no significant contribution to medical science. This judgment may be partially correct with respect to German medicine but not at all with respect to British medicine whose greatest achievements were not in the realm of theory but in practice. Indeed, even the sober English have not kept entirely free from attempts at hypotheses designed to classify facts and systematize, but they did not give allegiance, or at least they did not give unconditional allegiance, to any of the existent systems, proclaiming aloud the superiority of facts over ideas and despising every theory unless some direct and immediate benefit could be expected to accrue from it.

The importance of the eighteenth century lies mainly in its skeptical and critical or "enlightening" tendency. It laid—so to speak—the axe to the roots of the various departments of cultural thought and science. British criticism of medical science and art started very early with the opposition to dogmatic scholasticism. Roger Bacon's treatise, *De erroribus medicorum,* comprises a criticism of the spirit in which studies were then pursued and an exposition of a new scientific method. It enumerates almost thirty-six defects of medicine. The deficiencies of physic are set down by Francis Bacon in his *Novum organum* and in his *Advancement of learning.* He finds great fault with the discontinuance of that useful Hippocratic method of writing narratives of particular cases with "diligence and exactness containing the nature, cure and event of distempers." Thomas Sydenham, after having read many books and after observing the steps of nature in disease for many years with watchful eyes, lays open his doubts and his ignorance with noble but rare sincerity. He shows that he had little or no confidence in the doctrines of authors and very limited confidence in his own experiences. Sydenham complains of the excess of drugs and advises his brethren to abstain more from prescribing medicines and to trust na-

* Buffalo, New York.

ture. Everard Maynwaring (1628–1699), who called himself "doctor in physick and hermetic philosophy," was in advance of his time in condemning the use of violent purgatives and indiscriminate bloodletting. Gideon Harvey (1640?–1700?) was a copious writer who turned a piercing light on medical customs and persons of his time. He ridiculed sharply certain old-world preparations—theriaca, mithridatica, etc.—traditionally preserved in the *London Pharmacopeia.* One of Gideon Harvey's works—a collection of random criticism on medical practice—has an ironical title *The art of curing diseases by expectation* (London, 1689). This book acquired some reputation on the continent through the patronage of Georg Ernst Stahl. Richard Mead in his Harveian oration of 1723 compared the status of ancient and modern medicine to the disadvantage of the latter. This declaration provoked, of course, much literary controversy. But the most complete criticism of eighteenth century medicine comes from Francis Clifton and William Black.

Francis Clifton (?–1736) of Great Yarmouth, Norfolk, received an M.D. degree at Leyden in 1724. His inaugural dissertation, *De distinctis et confluentibus variolis,* was included by Haller in his *Disputationes ad morborum historiam et curationem facientes.* Clifton settled in London where his classical and scientific attainments won him the friendship of many eminent men, among others Sir Hans Sloane, at whose instance he was elected a fellow of the Royal Society in 1727. He published in the same year *Hippocratis coi operum quae extant omnium secundum leges artis medicae dispositorum,* followed in 1732 by *Proposals for printing, by subscription, all the works of Hippocrates in Greek and Latin, digested in a new and regular manner.* Clifton also received an honorary degree of M.D. from Cambridge in 1728. In the same year he was admitted to the College of Physicians. In 1732 he read the Gulstonian lecture. He also held the appointment to the Prince of Wales which he resigned in 1734, leaving London abruptly for Jamaica for obscure reasons. Besides the above-mentioned works he published *Tabular observations recommended as the plainest way of practising and improving physic* (London, 1731) and *Hippocrates upon air, water, and situation* (London, 1734).

Clifton, in his work *The state of physick, ancient and modern* (London, 1732, and French translation by Abbé Desfontaines, Paris, 1742) says:

"Having thus gone through what I all along intended, and given a short view of the *State of Physick* from the earliest Ages of the *Greeks* to the times we now live in, (by which the reader is convinc'd, I hope, of the insignificance of *Hypotheses,* and the importance of *Observation*). I come now to propose the *plan* for *improving Physick,*

and making it more useful in our days, than ever it was before. This, I apprehend, may be brought about "by Physicians rejecting every thing that is doubtful or perplex'd, and cultivating the business of *Observation* in the best manner it is capable of." By this means we shall come (if ever we can come) to the true knowledge of diseases, and the readiest method of curing 'em, especially as the *Materia Medica* is so vastly improv'd to what it was among the *Ancients.* Whereas, while we are ignorant of the true state of diseases, or at least not sufficiently acquainted with their *natural appearances, periods* and *terminations,* is it to be wonder'd at, that mistakes shou'd often happen, both in the *explanations* that are attempted by some, and the *remedies* that are administer'd by others.

". . . If the *Observations of the Ancients* are of no use in *England,* let us carefully avoid what they have told us, and industriously enquire how the case really stands *here;* in order to know the days that are *critical* with us, as well as they cou'd those that were *critical* with them. The knowledge of these things wou'd be of admirable use, and make the practice of Physick much easier, and more successful than ever: for this can never be had, but by a diligent observation of the course of diseases, and the effect of medicine; so that we shou'd plainly see what is done by *Nature,* and what by *Art,* and consequently be able to distinguish with more exactness, and prescribe with more honour to ourselves and more advantage to the patient.

"Add to this, that when we have got a number of *facts* together, sufficient to ground a good system upon, the *Philosophy* and *Anatomy* of the present times may help us abundantly more than we can now expect: but till this be done, the less we refine and *philosophize* in physick, the better it will be for the Patient, whatever it may be for the Physician. . . .

"Add to this, that the *philosophy* then in fashion was of a different stamp from that of the *Ancients,* and much more to be depended on, as it was the result of plain and evident experiments, and not the *chimæra's* of an inventive head: . . . The minds of physicians have . . . been almost intirely employd ever since with *Diagrams* and *Theories,* and a thousand things of that kind . . . to the neglect of other matters really important. The *body* has been survey'd inch by inch, and the suppos'd force of every fibre computed with a shew of surprising exactness. The fluids have been examin'd by all the ways that cou'd be thought of; . . . In a word, the *speculative* part of physick has been vastly improv'd within a *century,* . . . and by the sagacity and industry of the *moderns,* we have in many respects the advantage of the *ancients,* especially in *Anatomy;* so far at least, as the knowledge of the *situation,* the *structure,* and the *use of the parts,* is a real advantage in physic. . . . But yet the business is far from done. Diseases are known much less than might reasonably be expected . . . we have *Theories* in abundance, and treatises without number. . . . Almost every physician has had a system of his own, with a mixture of more or less of his own country's philosophy in it: and this seems to be the reason, why so many unaccountable things have been said and unsaid by physicians of every nation in Europe." . . .

"As to the writers of *observations* (which are very few, in comparison) they, for the most part have trusted to their memories for almost all the cases they have left us: a very fallacious way of instructing, and by no means proper for a physician. Baglivi . . . was so sensible of this, and of the tendency of the course physicians were then in, that he wrote a treatise on purpose to shew the usefulness and necessity of *regular and judicious observations,* preferable to any thing else in Physick, and has laid down a great many ingenious rules for that purpose, both for private persons and public societies. But I'm afraid the method he prescribes will never be made use of. . . .

Even Baglivi himself . . . has given us a more imperfect account of some things then might have been expected, even from a plan less perfect."

"Hippocrates is by far the best example."

"*Arts and Sciences* are not to be improv'd but by judicious experiments and fair conclusions. . . . This doctrine was soon after confirm'd by the great discovery of the *Circulation,* a discovery, that let in more light upon the *animal economy* in a day, than whole Ages were capable of before. All the disputes about *bleeding* . . . and in short all the *Theories* of the *Ancients* were destroy'd in a manner at once, by this single discovery. . . . [The *Medicina Statica Sanctorii* was another notable discovery. In the small but excellent book of Santorio] the doctrine of *perspiration,* sensible and insensible, the effects of different *airs* and *waters, meats* and *drinks, sleep* and *watching, exercise* and *rest, venery* and the *passions,* are all so ingeniously consider'd here, and that not from any *Theory,* or philosophical speculation, but from regular and judicious experiments, made . . . by weight and measure. . . ."

"No wonder then that the physicians of those days shou'd have entertain'd hopes of seeing their Art in a state of perfection. . . . *Anatomy* was vastly improv'd, *Chymistry* much enlarg'd, and in great esteem. *Experiments* frequent and judicious. . . ."

"I wou'd not be understood, as I meant, that a physician shou'd turn his back upon the discoveries of the *moderns.* Far from it. He, who is a stranger to these discoveries, will make but a poor figure in physick, and so will he, who looks upon 'em as the main things. . . . And so the study of *natural philosophy,* tho' it cann't make a man a physician, will however make him a better physician. . . . But then it is equally true, that *regular and judicious observations* have done more good in Physick than all the *Theories,* and all the *discoveries,* that have ever been yet found out. What may be done hereafter by these discoveries is another question; the foundation having been laid but lately, and nobody has built upon it to signify, except . . . Herman Boerhaave. He indeed has wisely applied these noble discoveries; and from a variety of *chymical, mechanical* and *anatomical* experiments, and a compleat knowledge of the *Ancients,* has form'd the *concisest and best System.* . . ."

In order to procure a valuable collection of observations, Clifton proposes first of all that "three or four persons of proper qualifications shou'd be employ'd in the *Hospitals* . . . to set down the cases of the Patients there from day to day, *candidly* and *judiciously,* without any regard to private opinions or publick systems, and at the year's end publish these facts just as they are, leaving every one to make the best use of 'em he can for himself."

. . . If this plan be follow'd, the consequence will be, that Diseases will be better known, and easier cur'd, even supposing the *Materia Medica* should stand as it does. But if that also shou'd be reform'd, and put upon its proper foot, . . . everything wou'd then be done, that the *Art* is capable of, or that mankind in general can hope for: . . . The event wou'd answer our utmost wishes.

Equally constructive criticism of the state of medical affairs at this time is found in the works of William Black (1749–1829). He was born in Ireland and graduated M.D. at Leyden. In 1787 he was licensed by the College of Physicians of London. After living in Piccadilly for many years,

where he had a flourishing practice, he retired to Hammersmith where he died. Black is remembered chiefly as a statistician. He published *Observations on the small-pox and inoculations, and the decrease of mankind at every age with a comparative view of the diseases most fatal to London* (London, 1781). To the second edition of this work he added a postscript "containing an easy plan for new modelling and essentially improving the London bills of birth and mortality" (London, 1781). He also published *An historical sketch of medicine and surgery from their origin to the present time, and of the principal authors' discoveries, improvements, and errors* (London, 1782; a German translation was published by Scherf in 1789 and a French translation by Coray in 1798). A third work of importance published by him is *Comparative views of the mortality of the human species at all ages, and of the diseases and casualties by which they are destroyed or annoyed* (London, 1788).

Comparing the ancients with the moderns Black writes as follows:

"In understanding the pathology of diseases, whether from external or internal causes, we are greatly superior to our old masters. That knowledge acquired by bills of mortality is peculiar to the moderns. Obstetrics and surgery amongst the moderns have likewise made very considerable progress towards perfection. In the care of several acute and chronic diseases we can claim little, if any, superiority above the ancients."

"In the 'Methodus Medendi,' we have not made those rapid strides by modern discoveries in anatomy and physiology, chemistry, botany, etc., which might at first be supposed, and, naturally, expected. For instance, convulsions, asthma, apoplexy, palsy, epilepsy, madness, scrophula, dropsy, internal aneurysm, cancer, gangrene, and mortification still remain as difficult to cure, notwithstanding the structure and physiology of the brain, nerves, lungs, glands, blood vessels, circulation and perspiration are so well understood, and the component parts of the human fluids and solids so minutely scrutinized by chemistry."

"I have not the most distant intention to depreciate the basis of medical studies. All that I mean to insinuate is that physicians should not be totally absorbed in any one subordinate branch of medicine, whether anatomy, chymistry, physick, botany, or any other, as if by that means alone they could cure diseases. The attention of the moderns hitherto has been principally ingrossed by these preliminary branches and by theory, whereas they merely constitute the alphabet of medicine. In previously acquiring at schools the dead languages of Greek and Latin with some modern languages and other necessary sciences and polite accomplishments, and afterwards, at universities, the introductory rudiments of the different branches of medicine, nearly one third of life is spent. After this period, and gleaning all the practical knowledge contained in books, medical men should attend to the active and useful part of the profession, to the discovery of remedies and the diminution of mortality, and to settle facts in their progress. It is greatly to be regretted that not one physician in a thousand makes a single discovery nor adds an iota of information to the medical fund, but jogs on in the beaten routines and repetures, and like the bulk of academic doctors barely keeps alive what is already known. New facts, and original observations of utility are very thinly scattered, even in authors of great renown."

"Physicians should not despair of greatly extending the sublime part of the medical science, the diminution of mortality. Our grave meditations and medical knowledge are of little signification to mankind, if we do not acquire the means of healing and preserving lives. Ingenious theories are of no use to sick and diseased persons. The professors of medicine should not be distinguished by the subtility of their philosophical speculations, but by their public utility."

"Many chronic diseases, I know, are not to be removed in a few days, weeks, or even months. Fresh and temperate air, different diets and exercises, medicated mineral waters, baths and agreeable amusements are all powerful remedies. I am persuaded that in many diseases drugs either unskilfully administered, or out of season, do more harm than good."

"I believe that medical and even surgical knowledge in the cure of corporeal infirmities, and in the prevention of mortality, is very far remote from perfection."

The basic thoughts of Clifton and of Black are as true today as they were in their times in spite of the unbelievably great advance of knowledge and science in our age. But however much we may agree with Clifton's and Black's considerations, we also understand that they could scarcely influence their contemporaries. It has been proven by P. G. Cabanis' work *Du degré de certitude de la médecine* and by Johann Georg Zimmermann's book *Von der Erfahrung in der Arzneikunst* that eighteenth century medicine was not capable of any higher level of certainty. Medicine could not attain the desired certainty because of the lack of a pathological-anatomical and bacteriological basis for the conception of disease, the lack of physical diagnostics, and of experimental and statistical means for a sound evaluation of drugs and therapeutical methods. This aim was not reached before the first half of the nineteenth century. We have to admire Clifton and Black for the honesty of their critical thoughts and we have to pay them due respect in spite of their ultimate failure to change the medical conception of an age that was not ready for their ideas.

A History of the Doctrine of Cerebral Localization

Sources, Anticipations, and Basic Reasoning

WALTHER RIESE and EBBE C. HOFF*

Introduction

THE physician of the past would have regarded the isolation of medicine from philosophy,[1] so characteristic of our time, as a strange and unintelligible phenomenon. Not only was training in philosophical matters—logic and rhetoric—a basic element in medical education for centuries, but also the physician of the past would never have thought of undertaking treatment of the sick before having gained insight into human nature, the mechanics and dynamics of the human organism, its relation to the rest of organized nature and inanimate matter, and even those forces withheld from his empirical knowledge and left only to his faith, but nevertheless realities to him. It is only very recently that this tradition has been lost. He would have shrunk from the task of curing a patient before having faced the realities of life, birth, death, and disease as problems to be attacked and mastered by his trained and systematic reasoning. Although philosophers, in their turn, have always been attracted by the study of emotion, passion, sympathy, suffering, diet, health, death, and disease,[2] philosophy in

* Medical College of Virginia, Richmond.

[1] Celsus (*On Medicine*, Book I) stated that "at first the science of healing was esteemed a part of philosophy; so that both the treatment of diseases, and the contemplation of the nature of things, arose under the same authors." He believed these authors to be "those principally requiring this science, who had diminished the strength of their bodies by calm reflection and by nocturnal vigilance." This is a surprising anticipation of Jean Jacques Rousseau's doctrine of the origin of disease and of his views on the disease-precipitating effects of science, expressed in his Discours: "Si l'établissement des Sciences et des Arts a contribué à épurer les moeurs" (Dijon, 1750) and his "Discours sur l'Origine et les Fondements de l'Inegalité parmi les Hommes." In the latter work we read the following sentence: ". . . l' état de réflexion est un état contre nature et . . . l'homme qui médite est un animal dépravé."

Celsus referred to Hippocratic medicine as the first version of our art to become independent of philosophy. The medicine of Hippocrates, however, still largely utilizes philosophical methods and devices such as observation *according to rules*, systematic reasoning, introduction of a restoring principle into the interpretation of morbid phenomena, a doctrine of the origin and causes of disease, and finally a most general view of human nature. No wonder that Celsus must finally confess that "Hippocrates and Erasistratus, and some others, not content to treat fevers and ulcers, have examined also, to some extent, the nature of things, did not thereby become physicians, but by this became greater physicians. But there is need of reason in medicine itself . . ." (l.c., Prooemium) It is precisely this "need of reason" we have in mind when speaking of philosophy in medicine. *What we need is not speculative imagination or metaphysical dreams, but a controlled medical thought and philosophy of methods.*

[2] Nietzsche's "Ecce Homo" furnishes a representative example.

general has relinquished its old prerogative to decide in matters concerning the human organism and has become in this respect content simply to follow experimental medical advance. Medicine itself has today largely preoccupied itself with a tremendous assemblage of factual knowledge, often, it must be said, to a regrettable neglect of interpretation and principles. We must keep in mind the essential rôle of philosophy in medicine—both as understood by the physician of the past and as comprehended at present—as we trace the doctrine of cerebral localization.

The doctrine of functional localization is largely a product of the nineteenth century. Its basic element is to be seen in the attempt to correlate nervous or mental processes with *discrete* regions of the brain. We shall not, therefore, consider those more or less unsystematic attempts, which we find scattered through the history of medicine, to relate nervous function or the "soul" to the brain *as a whole*. This concept of a global type of localization reaches as far back as the Greeks and is to be discerned in the writings of Pythagoras, Alkmaion, Hippocrates, Plato, Erasistratus, and Galen. Likewise, we shall pass over the humoral-pathological doctrines of the Middle Ages, according to which mental capacities were localized in the fluid of the ventricles—doctrines which can be traced back to Herophilos. Nevertheless, we may not overlook one of the older attempts at localization, exemplified by Descartes' doctrine of the seat of the soul. In fact, *the doctrine of localization remains the legitimate child of the doctrine of the seat of the soul*. Therefore, one would expect to find its germs in that doctrine, originated and developed by Descartes in a planned attempt to relate the soul to a distinct region of the brain. For this reason, we must analyze in some detail the constituent elements of the Cartesian doctrine.[8]

Dogmatic Elements in the Cartesian Doctrine of the Seat of the Soul

One may designate as dogmatic elements in the Cartesian doctrine of

[8] That Descartes, on speculative grounds, selected the pineal gland as the seat of the soul is no longer of any actual importance, nor is it of relevance to us. What matters is that he developed a true *doctrine* of correlation of mental processes with cerebral structures, a doctrine equipped with all accessories of a *systematic* reasoning, and in which he discussed and analyzed all the problems involved in the subject. This doctrine stands, regardless of the organ selected, as the seat of the soul. The analysis of Descartes' doctrine presented in this paper is the first attempt, to our knowledge, to discuss it *in the light of modern brain research*. Some preliminary remarks are to be found in Riese's paper: "The 150th anniversary of S. T. Soemmerring's 'Organ of the Soul (1796).' The Reaction of the Contemporaries and its Significance To-Day." *Bull. Hist. Med.*, 1946, *20*, 310–321. This paper contains also the first version of Riese's analysis of Kant's discussion of our subject. Some of the passages quoted from the work of Descartes were brought to our knowledge by P. Lachièze-Rey, professor of philosophy at the University of Lyon.

the seat of the soul those passages of his work in which the idea of a seat of the soul is conceived as a *local* residence of the soul. It is the *conarium* (the pineal gland) which is singled out as this local residence. This region of the brain is considered by Descartes to be the seat of the soul as well as the *sensorium commune* and of thought. The reasons which directed the philosopher to the pineal gland as the *main* seat of the soul, or simply as the seat of the soul, were first of all *topical* in nature. He was influenced by the gland's general situation in the brain, its mode of suspension, and its mobility. These reasons are of only secondary interest to us since Descartes' neuro-anatomical concepts, as we see them presented in his *Traité de l'Homme* and *La Description du Corps Humain,* are not based on direct observation. What does interest us here, however, is the fact that Descartes cited among the reasons which determined him to select the pineal gland as the seat of the soul the *single* existence of this organ. Descartes considered that the *unity* of the soul requires the union of two impressions, such as are received and transmitted by a pair of sensory organs like the eyes or ears, into a single impression; and it is precisely the quality of *not* being a double organ which fits the pineal gland for the fulfillment of this function. Here we witness the passage from a metaphysical unity, *i.e.,* the unity of consciousness, to a physical unity in the pineal gland. Descartes' apparent failure to understand that the soul must be resident in the whole body becomes even more evident as he stresses the necessity of uniting two sensations into one, and as he invokes the fact that we have but one thought at a time. His failure is completely exposed in his reasoning that, our soul being one and indivisible, the part of our body to which it is most intimately united must of necessity be one, and not divided into two similar parts.

If it is true that the classic doctrine of cerebral localization is, in the final analysis, a contemporary and particular expression of the doctrine of the seat of the soul, the latter must contain the germs of the former. It is true that the soul is banned altogether from the doctrine of cerebral localization; let us remember that this doctrine was conceived in the nineteenth century. Here various and multiple functions now take over the rôle assigned to the soul in the doctrine of the seat of the soul. It seems that as soon as the essentially metaphysical character of the unity of the soul is lost sight of, and as soon as one passes, albeit inadvertently, to the idea of physical unity, the road is open to decomposition and divisibility of the soul. And indeed, the thesis that one part of the brain, exclusive of others, harbors the soul holds the basic elements of the classic doctrine of localization: namely, limited divisions of space to which psychic qualities are attributed.

But the Cartesian doctrine of the seat of the soul contributes even more specific features to the foundation of the doctrine of cerebral localization: namely, the first steps towards a decomposition of the soul into discrete functions and their distribution over distinct regions of the brain. Indeed Descartes distinguished a localization of *impressions* from a localization of *memory*. While the pineal gland is considered to be perfectly fit to receive all kinds of new impressions—and most unfit to preserve them—the rest of the brain, particularly its interior parts, is seen to be best fit to subserve memory, and even the nerves and the muscles share in this function. This distinction is not an absolute one. Descartes did not deny that the elements of experience which are retained by memory may also reside in some way in the pineal gland. This means that the germs of the doctrine of cerebral localization as gathered from Descartes are the first elements of a flexible rather than rigid localization. These somewhat critical elements, however, did not deter the philosopher from a dogmatic approach toward correlating cerebral lesions with functional disorders. Thus, he referred to injuries and diseases which, affecting the brain only, inhibit sensory functions without interfering with life.

Critical Elements of the Cartesian Doctrine of the Seat of the Soul

One may designate as the *critical* elements in the Cartesian doctrine of the seat of the soul those passages of his work in which a seat of the soul is conceived as the site of its *activity* rather than of its local residence. It is obvious that this interpretation involves a limitation of the *topical* element, and we shall see that contradictions are involved. Here Descartes reminds us that the soul is truly united to the *whole* body and not to one of its parts exclusive of others. Nevertheless, there is one region in which it displays its activity more immediately, and again it is the pineal gland where this is accomplished. The activity of the soul is not restricted to its point of junction with the brain, but it rather affects the whole brain and even the whole body; briefly, it is omnipresent. Gassendi, in his famous objection to the "Sixième Méditation Métaphysique" and to the Cartesian doctrine of the union of the soul and body, maintained that however small this region of the seat of the soul may be, it still is extended in space. In his answers to Gassendi's objections, Descartes did not enter into a discussion of this argument. For this reason, it is of particular interest that Descartes in one of his letters should have answered this objection by a precise analysis of what he actually understood by his idea of the seat of the soul. He states specifi-

cally that matter, which by its very nature (or by definition) is space-filling, excludes any other matter from the same space, while the presence of the soul, at the region of its union with the body, is compatible with the presence there of matter.

Another critical element in the Cartesian doctrine is to be found in his explanatory notes on the "images" transmitted to the brain from both sides of the body, and submitted to union so that only one and not two "images" may be presented to the soul. "Images" became keystones in the doctrine of cerebral localization as it took shape in the nineteenth century. Descartes, however, admitted for them but an *allegoric* and not a *real* existence. Their sole function was to *symbolize* but not to *copy* reality; the writing impressed into the brain matter is but a *code*.

The same idea is expressed in Descartes' discussion of what he called "corporeal memory" (*"mémoire corporelle"*). Neither the printed text of a book nor its analogue in the brain in any way resembles the reality they permit us to recall but are a secret code to that reality.

A further critical element of the Cartesian doctrine remains to be treated: namely, the flexibility of the relationship between structure and function. We have asserted that a doctrine of a seat of the soul comprises necessarily, though not implicitly, the anticipation of a doctrine of cerebral localization and that such an anticipation is actually detectable in Descartes' writings. But at the very moment a doctrine of cerebral localization is conceived, criticism also arises, and the arguments put forward reappear in all discussions of the problem. Villiers, a contemporary of Descartes, thus denied a simple, invariable interrelation between pineal gland disease and mental aberrations. Descartes himself contributed to a more flexible conception of the relation between structures and functions. Though admitting of "folds of memory" (*"plis de mémoire"*) invoked to explain the impressions of the corporeal memory, he did not consider these "folds" (undoubtedly conceived as morphological units) to be very numerous, because the same "fold" is related to all the things that resemble each other. *The same "fold" thus mediates various functions.* Consequently, Descartes' localization proves to be more flexible than that which holds to the specific quality of the various cerebral areas.

To illustrate the cerebral and localizing mechanisms, Descartes resorts to ideas strikingly similar to those encountered later in nineteenth century writings dealing with brain physiology; it seems as though only the word "engram" (instead of "fold") is wanted in the Cartesian text to establish a remarkable compatibility with modern thinking. One dare not

assume a direct Cartesian origin of basic features of the doctrine of cerebral localization; rather the opinion seems warranted that once the general idea of cerebral localization is conceived, details follow of necessity. Descartes' localizing efforts did not reach beyond the "corporeal memory"; the "intellectual" or "spiritual" memory depends on the soul only. Consequently, we must distinguish between functions susceptible to localization and those higher functions resisting all localizing attempts; in man these latter functions prevail. One certainly cannot underestimate Descartes' prudence in attacking the problem of what can and what should be localized. The idea and the term of cerebral localization of course pertain to the nineteenth century and it may be questioned whether an interpretation of the Cartesian doctrine in the light of the acquisitions and terminology of the nineteenth century is legitimate. True, a direct road leads from the doctrine of the seat of the soul to the doctrine of cerebral localization; nevertheless, it is probably true that Descartes, who retouched his doctrine in many a way, would have recognized little in common between it and the dogmatic doctrine of cerebral localization.

The Sensorium Commune

In Descartes' *Traité de l'Homme,* as in his other writings, particularly in his *Passions de l'Âme,* the brain is considered to be the "main seat of the soul." But in the same treatise, the pineal gland is believed to be the "seat of imagination and sensorium commune." Much confusion must and did arise from this twofold functional rôle of the pineal gland as seat of the soul and that of sensorium commune, the more since the sensorium commune is but a part of the *body,* but not yet soul. Though using the two terms somewhat loosely, Descartes nevertheless differentiated sharply between them.

Ever since Descartes' conception of his doctrine of the seat of the soul, the sensorium commune has been linked with the name of the French philosopher. Indeed, Descartes drew on medieval sources and Augustine may have been the first[4] to localize the sensorium commune in the first ventricle (*cellula*) together with the *vis phantastica* and *vis imaginaria.* Descartes' hypothesis that the pineal gland has to be considered as the seat of imagination and sensorium commune appears to the historian as an unmistakable revival of a medieval tradition from which he deviated only

[4] Sudhoff, W. *Die Lehre von den Hirnventrikeln in textlicher und graphischer Tradition des Altertums und Mittelalters.* Diss. Leipzig, 1913.

insofar as he shifted the sensorium commune to a solid part of the brain. This step was to become decisive, since it was a most substantial contribution to the opening of a new chapter of medicine, namely, neurology or the doctrine of nervous functions and nervous symptoms related to the central nervous system as to a solidum. Descartes was also the first to outline the scheme of reflex activity,[5] a basic principle of modern neurophysiology.

It was the equivocal use of the term "sensorium commune" which engendered the dialectic wavering between two different versions of our subject—that of a seat of the soul and that of a simple ending of the nerves at a common end station. The latter was believed to be the corpus callosum by Bontekoe, Lancisi, LaPeyronie, Louis, Bonnet, Chopart, and Saucerotte; the septum cerebri by Digby; the centrum ovale by Vieussens; the corpus striatum by Willis; the cerebellum by Drelincourt; the pons by Molinetti, Haller, and Wrisberg; and the corpora quadrigemina by others. Still others saw it in the thalamus; Crusius and Mieg in the spinal cord. Soemmerring himself claimed the cerebral cavities and the cerebrospinal fluid to be the sensorium commune or the organ of the soul. It was this same dialectic between a metaphysical and a neurophysiological version of the subject which survived, though reshaped by the vocabulary of the nineteenth century, as the localization of mentality or consciousness and that of simple neurophysiological processes or excitations underlying motion and sensation. Critical writers, whether philosophers or physicians, repeatedly warned against any localization of mental processes in limited areas and wanted localization restricted to purely physiological phenomena.

Why is it so difficult to renounce localization of mental phenomena in the brain or in parts of it? How may we explain the permanent revivals of the doctrine of the seat of the soul in ever reshaped forms? Why is it so difficult to adopt a sober principle of localization restricted to a correlation of motion and sensation, *i.e.*, of physiological processes with nervous structures? These difficulties and the dialectic wavering between the two extremes, namely, that of a brain harboring the mysterious qualities of a soul or its derivatives, and that of a brain admitting of no more than types of movement,[6] are reflected by the various and changing meanings through which the term *anima* had to pass and is still passing. Since the early days of human thought, *anima,* understood to be air or breath, has been con-

[5] Riese, W. and Réquet, A. *L'idée de l'homme dans la neurologie contemporaine,* Paris, Presses Universitaires de France, 1938.

[6] Riese, W. An outline of a history of ideas in neurology. *Bull. Hist. Med.,* 1949, *23,* 111–136.

ceived as the source of life (*anima mundi*) and soul. Motion being a sign of life, the term "animated" was applied to living creatures endowed with motion and it thus became almost restricted to the animal world. But it never gave up its meaning as life and soul. When motion (and sensation) were related to the nervous system, this organ inherited that other quality of the *anima,* namely, soul. From the outset, the doctrine of the seat of motion was thus in indissoluble union with the doctrine of the seat of the soul. Whoever believes in human language as the symbol of human thought will not be surprised to discover early theories of knowledge or cosmologies as formative sources of our terms.

Principles of Cartesian Neurophysiology

Descartes believed that the "most active and quickest particles of the blood" are carried by the arteries from the heart to the brain to be converted into a very subtle air or wind, or a very active and pure flame, called the *animal spirits.* More specifically speaking, the arteries were believed to be assembled around a certain small *gland* situated at the centre of the cerebral substance. The animal spirits dilated the brain and rendered it suitable to receive the impressions of the external objects as well as those of the soul; the brain thus was considered the organ of the "sensorium commune," seat of imagination and memory. The animal spirits passed through the nerves from the brain to all of the muscles, so that the nerves served as organs of the external *senses;* by inflating the muscles they produced *movement.* An image of the object was traced on the eyegrounds and also on the internal surface of the brain. The animal spirits, leaving the gland, traced in their turn an image on its surface. Neither the images impressed on the sense organs nor those impressed on the internal surface of the brain but only those traced on the surface of the gland were to become ideas, *i.e.,* forms, or images which the rational soul, once united to the body-machine, must consider immediately whenever it imagines or perceives an object. Due to the enlargement by the animal spirits of the intervals separating the fine fibers of the brain from one another and to the various arrangements of these fibers, the traces of the ideas were impressed on the inner part of the brain, seat of *memory.*

The animal spirits are clearly of Galenic origin. Singer[7] designates as the third key to Galenic physiology the *rete mirabile* wherein the vital is

[7] Singer, Charles. Some Galenic and animal sources of Vesalius. *J. Hist. Med.,* 1946, *1,* 6–24.

elaborated into the animal spirit, the liver, "source of the veins," being the first key and the heart, "nurse of the vital faculty and source of the arteries," being the second.

CONCLUDING CONSIDERATIONS OF DESCARTES' DOCTRINE

Descartes' attitude toward our problem admits of various, even contradictory interpretations. On the one hand, he speaks of a *"seat"* of the soul, thus using a term which leaves no doubt that he localized the soul at a well-defined region of the brain. Accordingly, he seemed to give up the basic principle that the soul had to be considered as *immaterial and indivisible,* and in no way related to what is extended in space. When he speaks of the *main* seat of the soul (*"le principal siège de l'âme"*), this contradiction becomes even more striking. Granting however small a seat to the soul, Descartes is compelled to locate within the body a thing which he himself defined as immaterial, and to confine to a *distinct* part of the body a thing the union of which with the *entire body* he has claimed. This is why Gassendi had good reasons for his objection. Gassendi's objection is justified, however, only as to polemics and criticism. Insofar as he admits of a material quality of the soul—however delicate and subtle the corporeal nature of the soul may be—his conception entails all the difficulties which puzzle anyone confronted with a materialized soul. Indeed, Gassendi could argue that Descartes places the soul "outside itself" (*"hors d'elle-même"*) by localizing it in a definite *part* of the body, while at the same time uniting it with the *entire* body.

On the other hand, the seat of the soul is to Descartes but a territory where the soul exercises its functions "immediately," or "more particularly." Therefore, it is but a territory of *functional* importance. According to Descartes, it must be admitted that the soul, the non-extended character of which the philosopher stresses again and again,[8] can nevertheless exercise its functions in one region more particularly than in another. The soul does not *reside* in this region, only its functions, and effects will be more *intense* there than elsewhere. *We thus are confronted with a localization of a particular kind.* In the classical and dogmatic acceptance of the concept as it grew later, localization meant the localized *presence* of the soul or of its manifestations and qualities at well-defined and limited parts of the brain. Localization as can be derived from Descartes' ideas means solely *activity* in one region rather than in another. Descartes' original text

[8] L'âme "pour être, n'a besoin d'aucun lieu" (*Discours de la Méthode*).

self to the cerebral organs. In trying to assign a local seat to the soul, *i.e.,* to strongly suggests these considerations and interpretations. We would be more sure we had correctly interpreted the philosopher did he not himself speak so many times of his famous "seat of the soul," a term which, in spite of Descartes' additional statements and explanations, will always imply a *local* factor. These difficulties will be overcome for us only by Kant who, objecting to any localized presence of the soul in the body, conceived and described its "virtual" presence, requiring no particular seat.

Kant's Solution of the Problems Involved in the Doctrine of the Seat of the Soul

In those passages of his work devoted to our problem, Kant takes up anew the topic of the polemics between Descartes and Gassendi, though apparently unaware of that famous seventeenth century discussion. Kant, at least, does not make mention of it specifically. At first approach, it seems as if Kant's ideas and even his terms were identical with those of Gassendi. Indeed, in his letter of August 10, 1795, to Soemmerring, Kant specifically pointed to *the fundamental difficulty implied in the doctrine of the seat of the soul,* namely, *the establishment of a spatial relation of consciousness of* one's absolute self, one is compelled to perceive one's self by exactly the same sense by which one also perceives matter surrounding one. But the soul, he said, perceives itself only by the internal sense; thus it cannot assign to itself any place in the body (which it perceives by external senses), unless it makes itself an object of its own external intuition and situates itself outside itself, which is contradictory.

For having placed the soul "outside itself" is exactly why Gassendi reproached Descartes. A textual conformity between Gassendi and Kant is thus established which, however, does not go beyond the critical aspect and does not include Gassendi's dogmatic views.

The problem of the seat of the soul as a problem of metaphysics is considered by Kant "not only insoluble" but "contradictory in itself." There cannot be any localized presence of the soul. The thesis of a *"virtual"* presence, of which Descartes gives but a preliminary outline, is stated by Kant with utmost clarity. Actually it is to Kant that this thesis owes its name. The virtual presence of a thing does not prevent it from being penetrable by physical objects. In claiming a single organ as the seat of an *indivisible* thing, the soul, Descartes passed from the idea of a metaphysical unity to that of physical unity and by this very fact made a precarious contribution

to the solution of his problem. But in his admission that matter by its extension in space excludes any other matter from the place it occupies, *a property not shared by the "extension" of thought,* he comes close to the Kantian solution. According to Kant, the filling of space in the case of a virtual presence takes place by means of a force. This filling of space indicates only a greater degree of intensity of the force and not a multiplicity of the components of the acting agent. Consequently, it is not contrary to its simple nature. By this reasoning, we see demonstrated the compatibility of the presence of matter with the presence of the soul at one and the same territory.

If it is impossible or even contradictory to assign to the soul a particular seat, but if one's sensations compel one to pretend that the soul is present (though only virtually) at the region where one experiences one's sensations, this conclusion is arrived at: "Where I feel, I am" or "My soul as a whole is everywhere in my body and in its entirety in each of its parts."[9]

This conclusion implies a definitely anti-localistic attitude. It offers the counterproof of our thesis that the doctrine of the seat of the soul is linked with the doctrine of cerebral localization and that the denial of the one entails the denial of the other. Criticism against the first doctrine affects also the second. Descartes, endeavoring to give factual support to his doctrine of the seat of the soul, cited injuries and diseases affecting the brain exclusively and producing sensory disturbances. Kant, on the other hand, denying to the soul or to its manifestations any local residence, appealed to traumata involving large parts of the brain without affecting life or thought. Whatever the doctrine, there will always be facts in its support. Truth does not reside in isolated facts. Only an intelligent whole of reasoning and interpretation leads to truth; facts as such are unlimited in number.

[9] *Traeume eines Geistersehers* (1766). This work belongs to the so-called precritical period of Kant's writings. Kant here interpreted the soul as the "indivisible self" and he denied to it any spatial relation with the brain. Later in his correspondence with Soemmerring, he recognized the special rôle the brain plays in mind processes; but he now understood the latter ones, inasmuch as they can be correlated with the brain, to be merely associative in character. He saved the brain as an "immediate organ of the soul," admitting of a combination and separation of our sensations and the hypothetical chemical processes underlying them.

The critical passage in the *Traeume eines Geistersehers* which contains the doctrine of the omnipresence of the soul reads as follows: "I am just as immediately in the tip of my finger as in my head. It is also I who suffer in the heel and whose heart beats when moved. I do not suffer pain in a nerve when tortured by a corn, but in the tip of my toes. No experience teaches me to believe parts of my sensation to be remote from me, to imprison my indivisible self in a microscopical region of the brain, in order to put into motion from there the lever of my body machine or to be impressed thereby. That is why I would request strong evidence before being convinced of the absurdity of what the schoolmen taught: *My soul as a whole is everywhere in my body and in its entirety in each of its parts.* Common sense frequently becomes aware of the truth before knowing the reasons by which it might prove or interpret it."

Kant's most significant contribution is assuredly his delimitation of the soluble part of the problem raised by the doctrine of the seat of the soul from its insoluble part. After centuries of dogmatic assignment to the soul of ever-changing dwelling places, Kant with one master-stroke reduced the problem to its purely physiological aspect. All that remained of the once presumptuous fabric of argument as to the seat of the soul and all that was left to experimental research was the correlation of *motion and sensation* with the brain, these *alone admitting of a spatial relationship with the cerebral organs*. Kant's letter to Soemmerring of August 10, 1795, therefore, marked the birthday of a *rational* doctrine of cerebral localization.

Setbacks, Absurdities, and Revisions

We have seen that the basic problems comprised in the doctrine of cerebral localization were foreshadowed and anticipated in the Cartesian doctrine of the seat of the soul. They were brought to solution in the famous correspondence exchanged by Kant and Soemmerring, inasmuch as the nature of this "seat" was determined as activity and not as local residence and the limits set to our attempts to correlate mental processes with central structures. These limits restricted any such attempts to processes which can be expressed in terms of space, thus to physiological ones. Once this position was secured, the road was open to fruitful experiential research. But here the nineteenth century refused the heritage of the past. By its so-called unprejudiced search for facts, it condemned itself to errors and pitfalls. To rely on experience and observation as an avenue to knowledge is indeed an excellent method; but we must know *how* experience is made, and how *far* experience can be extended. Here we remain the followers and pupils of Aristotle, Descartes, and Kant. Under the impact of a growing materialism, the development and history of the doctrine of cerebral localization took a most simplified and uncritical course. It is true that materialism of itself has no organic relation to the doctrine of cerebral localization. Gall laid down the principles of a dogmatic doctrine of cerebral localization although he was not a materialist. Up to the first world war, philosophical thought in Europe, particularly in Germany, was of a definite idealistic character. This (somewhat vague and unelaborated) idealistic view of the world and of human affairs was shared by most of the German representatives of natural sciences and academic medicine. It in no way interfered with their strongly materialistic concept of the relation of mind and matter. This contradiction cannot but arouse the attention of all those interested in the history of cul-

ture and science. The materialists in their turn were more logical if just as wrong. A certain modern theoretician of materialism knew well why in his empirico-critical expositions he denied to the soul any non-cerebral character.

Materialism, to the extent that it enters the discussion of our subject, is an attempt to interpret the relation between the mind and matter. Although the doctrine of cerebral localization tries to establish a *topical* correlation between the two phenomena, it is not concerned with the problem of the *nature* of this mutual relationship. It gives no answer to the question of what really happens in those brain regions believed to "represent" parts of our body, movements, and thought. But in a century in which materialism went from one triumph to another, invading and ruling all spheres of life and thought, and in which the doctrine of cerebral localization of mind was adopted on the largest scale, the one could not fail to influence the other. Since the materialists of the nineteenth century conceived mind *globally* as a product of matter and since mind was now decomposed into its elements and "faculties" and allowed to reside in ever-smaller dwelling places of the brain, an overwhelming tendency must come to the fore, to relate more and more mind processes to insular territories of the brain, to leave nothing unrelated and unmaterialized. The brain thus became all-mighty not as an *instrument,* but as a *creator* of all mind processes, a usurper demanding and obtaining worship from its subjects. To remain in conformity with the doctrine of cerebral localization, the nineteenth century turned over an ever-increasing number of faculties and functions to their "centres." It became unthinkable to admit of any basic mental process not related to a well-defined area of the brain. Somewhere and somehow this tendency was bound to reveal its innate weakness and absurdity. The doctrine enters its crisis at the very moment that the phenomenon of consciousness of self is considered. If this consciousness of self is also traced back to a cerebral agency as its source and matrix, a second brain becomes necessary to "reflect" what is going on in the first one, and such a self-reflection has indeed been advocated by the nineteenth century materialists. It is evident, however, that a second brain would not be enough, since it now requires in its turn a third one, to "reflect" the processes taking place in the second one. There will be no end of brains and matter. Others preferred to consider consciousness of self simply as an illusion. But what remains as a criterion of reality if the most immediate fact of human existence is declared an illusion?

It would indeed have been possible to conceive a doctrine of cerebral

localization and to save at the same time the unity of consciousness. At least Jean Fernel[10] could write in the sixteenth century: "Though the manifestations of the soul are multiple, the soul itself is one. The different, and even opposed, functions of the several parts of the body do not mean a multiple soul." In the nineteenth century, unity could either have been left completely out of the discussion or else soul and unity could have been continued as an object of study and even of correlation with the brain, with the restriction, however, that they could not be related to a limited territory but rather to the organ as a whole if not to the organism as a whole. Thus the soul or unity of conscience would not have perished from the vocabulary and the thought of the scientist, though necessarily from empirical brain research. Such an attempt was finally made by Henri Bergson who had the courage to state before the scientific and philosophical forum of his time, involved as it was in an all-embracing brain materialism, that there was more thought in man than could be harbored by the brain. That the soul could not be related to a limited territory became one of the principles of Monakow's revised and reshaped doctrine of localization in which he denied to all non-reflex functions any limited representation in the cortex.

But the doctrine of cerebral localization as shaped by the nineteenth century could not separate itself from its two main constituents—decomposition and the unlimited correlation with the brain of the elements resulting from this decomposition. Decomposition or analysis in themselves are indispensable and precious instruments of human knowledge. We have to "spell" natural phenomena in order to understand and to master them. But decomposition and analysis become disastrous to our search for knowledge as soon as we ignore the fact that the physical fragments, at which we arrive as a result of our decomposing efforts, are not the sole constituents of a living organism. The latter is a self-regulated whole, and a place must be left to the regulating principle. The nineteenth century failed to interpret the organism in a satisfactory manner not because it submitted it to analysis, but because it submitted it to an *incomplete* analysis, neglecting the integrating principle. The admittance of the latter does not imply at all the "physico-theology" that the nineteenth century was so anxious to escape. *It can and must indeed be understood solely as a principle of interpretation and not as a metaphysical entity or a vital force.* The founders of the doctrine of cerebral localization in its dogmatic shape did not feel the

[10] Sherrington, Charles. *The endeavour of Jean Fernel.* Cambridge, The University Press, 1946, x, 223 pp.

necessity of considering the integrative or *formative* agents; they were entirely satisfied with the *formed* elements of the organism. The doctrine of cerebral localization grew up with its sister, associational psychology, and the latter taught the former not only how to decompose a thought into representations and memory-images, the organism into its elements, the brain into its areas, but also how to recompose them out of these fragments. It is quite obvious to the student of history and methods of empirical research that no brain physiologist and no brain anatomist could ever have made the discovery of a center of association if the *idea* of an association had not been in his mind and if this idea had not preceded and guided the discovery of their existence. Associations are connections, and connections have to be traced between different and distant regions. How could the search for these associations have been performed without the previously conceived scheme of such an association, one center kept in mind (in spite of the intricacy of nervous structures) until another one, linked with the first, was detected and the association between them established? It was only logical that the adherents to a "Gestalt psychology"[11] were not in favor of a rigid localization of nervous function. The "Gestalten" indeed are ever changing, and no fixed scheme could reflect their true nature. Moreover, a "Gestalt" was conceived as an organized whole, and how could the conventional mosaic pattern of the brain, final result of the thought of our nineteenth century scientists and their present-day followers, give the true picture of an organized whole?

The materialistic doctrine of cerebral localization was submitted to a most comprehensive critical analysis by Lange. About seventy years have elapsed since his *Geschichte des Materialismus,* but his discussion of the doctrine of cerebral localization has lost nothing of its pertinence and acuity. To the *unlimited* localizing attempts of his contemporaries, Lange opposed a question whose methodological relevance immediately became obvious: What are we entitled to localize and what not? Anticipating half a century of research in the physiology and pathology of the brain, he stressed the fact that most of the processes we are inclined to consider as elementary in nature and to relate to limited territories of the brain are in

[11] The decomposition of the "soul" (or whatever "whole" or "Gestalt" may be called forth to substitute for the soul) into its elements was a result or a by-product of the doctrine of cerebral localization. As such it did not escape the insight of the writers of the early nineteenth century: "Autrefois, sous le titre de recherche du siège de l'âme, on désignait la recherche d'une partie cérébrale présidant à l'exercise de la sensibilité, de l'intelligence, de la volonté, des affections et des penchans. Aujourd'hui, on recherche quel est le rôle de chaque organe, et notamment de chaque partie du cerveau dans ces divers actes." *Dictionnaire abrégé des Sciences Médicales,* C. L. F. Panckoucke, Editeur, 1826, article on "Sensibilité," *14,* 310–315.

reality most complicated functions, resisting localization at well-defined regions. He was also the first to establish a clear distinction between a localization of *functions* and a localization of *symptoms,* again anticipating the work of Hughlings Jackson, Monakow, Henry Head, Goldstein, and others.[12] From the undeniable fact that a given functional deficiency or disorder results from a lesion involving a given region, we cannot draw the conclusion that the undisturbed function has its seat at the same region. But what finally remained the proper objects of our localizing efforts? No more than physiological processes, nervous mechanisms, excitations of the central substance that we might relate to the brain, leaving alone, as Hughlings Jackson did, the psychic acts. The problem of the interrelation of consciousness and bodily phenomena was declared futile.

Psycho-physical parallelism asserts the independence—although also the equivalence and correspondence—of physical and psychical series of phenomena, thus leaving no room for a discussion of the *interaction* of body and mind. The doctrine of cerebral localization presupposes precisely such an interaction; it isolates its *topical* element. Thus it is understandable that psycho-physical parallelism and the doctrine of cerebral localization did not become indebted to each other, with one exception, however, which assumed major importance in the history of neurology and our subject. The presumable self-sufficiency of physical and psychical series of phenomena, a feature so characteristic of psycho-physical parallelism, was made a major element in Hughlings Jackson's scheme of cerebral localization. He endeavored to establish a doctrine of cerebral localization on exclusively *physiological* grounds. The theory of psycho-physical parallelism helped him to justify neglect of conscious phenomena, be it only for didactic reasons, and to consider solely the physical or physiological aspect of mentality. Only the latter, he correctly assumed, was open to correlation with the brain and thus to localization.

Our subject could hardly be of major interest to those to whom the physical and psychical are no more than two aspects of the same thing, or two different ways of expressing and interpreting it. This doctrine of identity recalls the *res extensa* and the *res cogitans* of Spinoza. But let us not overlook that the "identical" in Spinoza's system, the "absolute substance," is withheld from human knowledge and therefore not open to empirical study at all, be it on physical or be it on psychical grounds. The

[12] Actually Platner probably was the first to make this distinction: "Derjenige Theil des Gehirnmarks muss nicht der Sitz der Seele seyn, auf dessen Verletzung ein schneller Tod oder Verstandesverwirrung erfolgen." *Philosophische Aphorismen,* Leipzig, 1776, p. 50.

organism we study is a concrete reality. The assumption that the laws to which the psychical phenomena are submitted are the same as those discovered by analysis of the physiological phenomena, both referring to the same organism, comprises a precarious element; the "organism" might indeed be conceived as self-sufficient, a kind of higher reality, behind our "ways" of describing and interpreting it, in short as something absolute in itself. But then no conclusion should be drawn from our observations and experimental statements as to its nature, since the latter would be withheld from our knowledge forever. It is entirely legitimate to look at the physical and at the psychical as two different ways of thought or two kinds of representation. But this does not silence the imperious need for the study and the knowledge of the laws presiding over the interaction of these two representations or phenomena, a need as old as human thought. That one of these two types of representations (the psychical or temporal) cannot be expressed in terms of the other (the physical or spatial) is the result of a critical reasoning we still have to rediscover.

Henri Bergson must be counted among those few contemporaries satisfied neither with traditional brain materialism nor with psychophysical parallelism so popular in the second half of the nineteenth and the beginning of the twentieth century. He is generally considered a neo-vitalist, the introduction of his "élan vital" as a creative factor into life and evolution indeed suggesting this stigmatization. But full credit must also be given to the *rational* element in his work. The historian of medicine realizes the strength of this element in reading Bergson's lecture on Claude Bernard. It is precisely this rational factor which we can detect in those of Bergson's writings in which he treats the problem of the interrelation of mind and body. We may distinguish two major elements in Bergson's discussion of our problem. He was convinced that a given mental state is related to a given cerebral state, *but not vice versa.* He thought it impossible to derive from a given cerebral state a corresponding mental state. A number of mental states, he believed, fit the same cerebral state. Thought, he presumed, was not wholly determined by the brain. Here he was nearer to the truth and to a rational solution of our subject than Schopenhauer in his *Kritik der Kantischen Philosophie,* though the latter felt certain that in his time he was the only impeccable interpreter of Kant's rational cosmology and the place assigned to man in the universe. Schopenhauer indeed related the *Apriorica* to the brain, not realizing that the brain in itself is nothing but one phenomenon among others and that the *Apriorica* (space, time, etc.), the instruments by means of which our organizing mind con-

structs the objects of our experience, cannot be left in their turn to such an object as to their source. Nothing indeed seems to be more difficult and more provocative than to recognize formative principles of our experience which cannot be borrowed from any empirical object. By rejecting a *constant* relationship between a given psychical state and a corresponding cerebral state, and by admitting of various psychical states related to the same cerebral state, Henri Bergson, though a thinker, not a neurologist, touched upon one of the major difficulties and pitfalls to which we are exposed in our localizing efforts. The whole doctrine of cerebral localization lost much of its credit because of these difficulties. Since Monakow's time we designate as "negative cases" those observations in which a brain lesion involving a region believed to be the critical area of a given behavior was not precisely related to the same behavior; thus, lesions of the critical areas of speech might not be associated with speech disturbances. The explanation of these cases[13] has always been an embarrassment to brain pathologists; they are probably more frequent than previously believed, and their interpretation involves the whole problem of cerebral localization.

But if the relationship between brain and thought is much less simple than is generally admitted, if the correlation of mental states with cerebral states is more flexible than suspected, and if thought cannot be made a prisoner of the brain, what is precisely the rôle of the brain according to the French philosopher? Only what can be expressed in terms of movement can be related to the brain. The basic element in Henri Bergson's discussion of our problem is to be found in his doctrine that thought means action. If real actions do not result, then at least potential ones do. These real or potential actions are what will be registered in the brain.[14] The brain isolates from thought all that can be expressed in terms of movement and thus become materialized. The brain guarantees at any moment our adaptation to a given life situation, it thus becomes an organ of attention. The hypothesis of memory-images, clichés, or phonograms must be abandoned; whenever we need recollection, our body assumes that attitude or "nascent movement" (*"mouvement naissant"*), which might be the best possible frame for what has to be remembered. Cerebral lesions do not destroy (hypothetical) deposits; they only impede the *evocation* of past events. The brain being an organ of attention, and attention meaning re-

[13] See Riese, W. Aphasia in brain tumors, its appearance in relation to the natural history of the lesion. *Confinia neurol.*, 1949, *9*, 64–79.

[14] Thought might be expressed in terms of action. It is however dangerous to identify such an "action" with simple movement. Only the latter one comprises *necessarily* a physiological element. This ambiguity gives rise to dialectic difficulties which Bergson and his followers could not escape.

jection of all that is not compatible with the actual situation, the brain also becomes an organ of choice. Henri Bergson came very close to the views of the British neurologists and neurophysiologists, Hughlings Jackson, Sherrington, and Henry Head. His most valuable contribution to our subject can be seen to be his effort to reduce thought to its physiological element (movement), as the only element admitting of correlation with the brain. In this he ranks with those *rational* philosophers and physiologists who overcame the century-old tradition of a seat of the soul by limiting our localizing efforts to those processes which can be expressed in terms of space, namely, physiological ones.

DIALECTICAL MATERIALISM AND CEREBRAL LOCALIZATION

There can be no doubt that dialectical or historical materialism adopted a much less simplified and much more dynamic view of our subject than the mechanistic materialism which flourished in the nineteenth century. The influence of political opinions on scientific doctrines, obvious also in neurology, has been stressed by one of us.[18] In the first years of the Russian revolution and during the founding of the Soviet philosophy of the state, society, and human life, an ideological struggle was fought between the mechanistic and dialectical materialists, a struggle from which the latter emerged victorious. Dialectical materialism is now the all-pervading doctrine and method in the USSR and it is most significant and of greatest importance to the historian of medicine and natural science that its controlling influence is felt and is detectable even in our subject, apparently so far from the perturbations and regroupings of political life and doctrines. The problem of cerebral localization was the subject of a special and combined meeting of the Moscow Institute for Brain Research and the Society of Neurology and Psychiatry, held on March 1 and 2, 1940. "The papers submitted to the meeting were characterized by the historical method, by the tendency to discuss the structural, functional and pathological features of the central nervous system in the light of their evolution, development and phylogenesis." That so-called localization was considered to be but the "expression of a given evolutionary stage" was certainly a very general formula arrived at by means of the historical method. Criteria of a dynamic localization were found in the variability and heterology of cortical (cytoarchitectural) structures, in the influence of age and species on functional

[18] Riese, W. History and principles of classification of nervous diseases. *Bull. Hist. Med.*, 1945, *18*, 465–512.

disorders of the central nervous system, and in a more diffuse representation ("irradiation") of stimuli, compatible however with some local accentuation. Luria admitted that "the complex brain function is to some extent as independent of separate brain areas as planned movement is of any single muscle." Most remarkable was the admission in the Moscow meeting of a change in nervous function in spite of the continued use of pre-existing structures (previously used for other functions) and even of a structure-*producing* influence of nervous activity. This seems hardly compatible with the basic doctrine according to which the phenomena of consciousness and will are wholly due to the operation of material agencies, but not vice versa. Soviet neurology makes no distinction between spatial phenomena admitting of localization and non-spatial ones resisting localization, it remains in complete harmony with "western" neurology and shares with the latter the neglect of the efforts and acquisitions of the past.

Omnipresence versus Local Residence

It is significant that Kant believed Stahl to be "nearer to the truth" than Hoffmann, Boerhaave, and others who preferred the mechanistic explanation of organized nature. The Stahlian school adopted the doctrine of the omnipresence of the soul. In the nineteenth century Lotze objected to "this beautiful semblance of omnipresence," on the ground that "the soul . . . loses its power of setting up movements the moment the continuity of the conducting nerve is broken; that therefore the space within which body and soul act directly on one another is limited, and must be found somewhere, though we cannot yet define its limits, within the central portions to which all impressions are conducted and from which all impulses to voluntary movements start." Here we grasp to its full extent the error in method which became so disastrous to the doctrine of cerebral localization. From the correct observation that nervous function may be *disturbed* or even abolished by a lesion involving a given region of the brain, the entirely unjustified conclusion was derived that the *undisturbed* function had its seat at the same region. While we have good reason to maintain a localization of disturbed functions or *symptoms,* we are not entitled to proclaim a cerebral localization of undisturbed and natural *functions.* Again no one will deny that the activity of the soul is most vulnerable to lesions in the central nervous system; but this does not mean that the soul has to be imprisoned within the limits of the central nervous system. To Lotze, of course, the road was re-opened for the search of the

seat of the soul. The doctrine he developed is most interesting as a product of *compromise,* because he did not give up the soul as unity and turned at the same time his greater attention to its "diverse activities." The soul, he said, stands in direct interaction with those elements which are assigned in the order of things as the most direct links of communication in the commerce of the soul with the rest of the world. "At each of these elements the soul would be present, with equal completeness, but not therefore without any distinction; rather we might suppose that at each of them the soul exercises one of those diverse activities, which ought never to have been compressed into the formless idea of merely a single outgoing force." His conviction that "the laboriously intricate structure we find in the brain would become wholly unintelligible," were we to relate the soul to *all* the constituent parts of the brain, was of no little help to him in his search for a limited space at which to locate the soul (at least in principle). He too did not realize that intricacy of nervous structure is no criterion of intricacy of nervous function or of the "soul."

It may be thought that the theme, "omnipresence versus local residence" lost its significance once the central nervous system was adopted as the organ of mentality. But the discussion which centered in the middle and second half of the nineteenth century around Pflueger's "spinal soul" was nothing but a revival of our theme shifted to the central nervous system itself. Has the soul (or volition) to be left to one region of the central nervous system exclusive of others, or do all levels have their shares in it? The true significance of this alternative cannot be grasped if it is isolated from its historical theme: "omnipresence versus local residence."

The problem of the "spinal soul" is of more than experimental and academic importance. The question raised is not only that of a selective representation of voluntary or conscious action in limited regions or divisions of the central nervous system, but that of the very existence of two types of action, a reflex type in which consciousness has no share (a revival of Descartes' hypothetical body machine) and a conscious or "intelligent" one. The problem cannot be solved on the ground of dogmatic statements as to presence or absence of consciousness in others. It was most fortunate that Ferrier, when discussing Pflueger's "spinal soul" referred to the fact that "the existence of consciousness in others is only an inference from our own experience, and that we are inclined to attribute to consciousness such actions as necessarily imply distinct sensation and intelligent action on our own part."[16] It is therefore wise to renounce in experimental physiology

[16] Ferrier, David. *Functions of the brain.* New York, G. P. Putnam's Sons, 1880, xiii, 338 pp.

terms such as consciousness, volition, or any other term implying functions accessible only to self-experience. Reactions of lower species or of fragments of the nervous system simulating "intelligent" actions, should not be attributed to a "soul," the existence of which cannot be made the subject of experiential research; but our own soul must be used as a principle of interpretation in the study and analysis of the behavior of other living beings. What makes our reactions intelligent? What is the essence of voluntary action? Obviously it is action according to plan and not to chance. But a plan presupposes unity of concept, and acting according to plan presupposes unity of action. As stated in a previous paper,[17] integrative action, interpreted as the unity of the organism, took over the rôle assigned to the soul by previous generations. Integrative action cannot be denied to the most elementary and most fragmentary product of organized nature. This integrative element is generally described as a purposeful or adaptive one conceived by Sherrington as an intrinsic element of reflex activity, which therefore can no longer be basically opposed to intelligent or voluntary action. On these grounds Pflueger's doctrine of the "spinal soul" stands today as it stood a century ago. The "soul" indeed has disappeared, but the doctrine of "the seat of the soul" did survive as a doctrine of the localization of intelligence in limited parts of the central nervous system. In modern terms the idea of the "soul" may be retained as integrative action to which any "seat" is denied, since integration is inherent in the smallest fragment of organized nature.

[17] Riese, W. The 150th anniversary of S. T. Soemmerring's "Organ of the Soul." *Bull. Hist. Med.*, 1946, *20*, 310–315.

William Hunter's Early Medical Education*

Part I

His Studies under William Cullen and at Edinburgh with Alexander Monro

FENWICK BEEKMAN†

WILLIAM HUNTER, having given up all idea of entering the Church, returned to Long Calderwood from the University of Glasgow in the autumn of the year 1736. He was then but eighteen years of age and was apparently desirous of choosing some occupation of an intellectual character. It is said that he applied for the position of schoolmaster at East Kilbride but failed to obtain the appointment. He did not, however, remain idle for long, for he soon received an invitation from a young surgeon-apothecary—a friend of the family by the name of William Cullen who had just begun to practise in the neighboring town of Hamilton—to join him as an assistant or, as some have said, a voluntary apprentice. Gladly accepting the invitation, William Hunter moved during the late autumn, or perhaps in one of the early months of the following year, to reside with his friend who at the time was unmarried. "In the family of this excellent friend and preceptor," writes Hunter's earliest biographer, Samuel Foart Simmons, "he passed nearly three years, and these as he has often been heard to acknowledge were the happiest years of his life."

Cullen, eight years the senior of his young pupil, had been established in practice at Hamilton for less than a year. Although an active practitioner, he had not as yet—like so many other practitioners of Scotland at that time—qualified under the law of the Faculty of Physicians and Surgeons of Glasgow to practise medicine.‡ Though a more or less self-taught man, he had nevertheless become well trained, much of his knowledge having been obtained through clinical experience, for he had had considerable

* This is the third of a series of articles by the author on the formative years of those two great Scotsmen, William Hunter and his brother John Hunter. The previous titles have been: "Long Calderwood, the birthplace of the Hunters," and "William Hunter's education at Glasgow, 1713–1736." Part II will appear in the next issue of this *Journal* and will have a bibliography covering both parts at the end.

† New York City.

‡ Cullen did not receive his degree in medicine until the year 1740 (granted by the University of Glasgow) and his name was not entered upon the "Roll" of the Faculty of Physicians and Surgeons of Glasgow—the licensing body for the western shires of Scotland—as "freeman" until the year 1744.

responsibility thrust upon him during the previous nine years in handling both medical and surgical cases.

When about seventeen years old, following a session spent at the College in Glasgow during the year 1727, Cullen had bound himself as apprentice to a Mr. John Paisley of Glasgow who, though a surgeon-apothecary, was nevertheless a much honored and respected member of the Faculty of Physicians and Surgeons. Paisley, who had built up an extensive practice, was a scholarly man who had begun to show a more liberal spirit towards the acquisition of knowledge through clinical inquiry than was generally the case among his compatriots at this time. Though Cullen remained with him for only a little longer than a year, a close friendship developed between them, and when Cullen requested that his indenture be cancelled after this period of time—too short to be of service for the formal approval of an apprenticeship—Paisley amicably consented to the parting. In after years, when his former pupil returned to Glasgow as a lecturer at the University, the friendship was renewed and Paisley generously opened his large library to the use of Cullen's students.

On leaving Glasgow in 1729, Cullen visited London "with the view," we are told, "of obtaining a situation in which he might enjoy opportunities of acquiring a practical knowledge of his profession." Soon after his arrival in the English capital, he received an appointment as surgeon to a merchant ship about to sail for the West Indies. "In this voyage," his biographer continues, "he had an opportunity of seeing new scenes of life, and manners different from those he was accustomed to contemplate at home; and, what was to him of great moment, an opportunity of observing the general effects of diversity of climate on the human constitution, and of marking the symptoms and progress of some of the diseases which prevail in our West Indian settlements, and which in particular seasons prove so highly fatal." Cullen often referred in his lectures to the experiences he had had during this voyage. On his return, he was employed for a time by an apothecary in London, obtaining, we are informed, an experience which turned his attention to the study of materia medica.

Having returned to Scotland at the end of 1731 or during the early months of 1732, he settled down to practise in a small village outside of Hamilton. But soon after starting on this venture, having inherited a small legacy he cast his practice aside for the time being in order that he might take up the study of literature and philosophy. Continuing his education, he then went to Edinburgh so that he could attend, among others, the anatomical and surgical lectures of Alexander Monro, the newly appointed

young professor who has been given so much credit for the establishment in the University of the first school of medicine to be founded in the British Isles, modeled after that at Leyden. Remaining at the University during the sessions of 1734–35 and 1735–36, he made many lasting friends among both the faculty and the student body. In the latter was a group of six young men who had formed a society during the previous session so that they might discuss matters connected with their studies, and of this Cullen became a member. At first, the group was known simply as "The Medical Society," but later members took the name of The Edinburgh Society of Physicians, which in the year 1773 began to publish *Medical and Physiological Commentaries.* Cullen formed lifelong friendships with three of his fellow members of The Medical Society. These were Alexander Russell, author of *The Natural History of Allepo;* George Cleghorn, who wrote *Observations on the Epidemical Diseases* and who after having studied under William Hunter in London became a well-known lecturer on anatomy in Dublin; and John Fothergill, prominent Quaker physician and friend of the American Colonies, who became a close associate of William Hunter. On completing his studies at the University of Edinburgh in the spring of 1736, William Cullen moved to Hamilton where, having become the protégé of the Duke of Hamilton, he settled in practice as surgeon-apothecary.

The association of William Cullen and William Hunter was of short duration but it proved to be most fortunate for each of them. Though in personality and intelligence they were quite different, as pointed out by Duncan who says they "form admirable illustrations of the two widely separated intellectual classes of great medical men"—Cullen the philosopher and Hunter the student of nature—they notwithstanding became congenial companions. Further, they had in common a remarkable enthusiasm, an inordinate ambition to attain success, and an unusual capacity for tireless labor in solving whatever problem was undertaken. They had been brought up in similar circumstances, both having been sons of intellectual, industrious landowners, and having attended their local grammar schools, but their later training had been quite different. Cullen, after finishing grammar school, had obtained his education in the difficult way. His collegiate training had lasted for only one year, and after that he had been on his own for most of the time, learning through self-teaching, by reading, and observation during practical experiences. Later, he fortunately had been able to fill many of the gaps in his scholastic knowledge through private studies in literature and philosophy. And, finally, he had had the opportunity of attending medical school for two sessions, during which

time he had received academic instruction to supplement the knowledge he had already gained from experience. His teachers were enthusiastic young men, little older than he, who had but a few years previously sat at the feet of the great Boerhaave, absorbing his "Delphic utterances" which in that day were influential (but today are known not to have assisted much towards the advancement of medical science, for neither Boerhaave nor his pupils understood the importance of inquiry as a means of obtaining true knowledge in even the basic studies of medicine). Cullen, while at Edinburgh, attended the lectures of Monro on anatomy and surgery, Plummer and Innis on materia medica and chemistry, and Sinclair and Rutherford on the theory and practice of medicine; but from these lectures he heard few if any facts concerning physiology, and absolutely nothing of pathology, for these sciences hardly existed at that time. Instead, he imbibed the false doctrines of the iatromathematical and iatrochemical schools in which all physiological and pathological happenings were explained either by laws of physics or as being chemical in essence. He was brought up on the importance of systems, so much so that in later life he spent valuable time attempting to construct a system for classifying diseases in a manner similar to that in which the botanists were grouping plants. He did not possess the scepticism or the knowledge so necessary for carrying out investigations; moreover, having been brought up in Scotland, his logic was that of deductive reasoning, a form utterly unfitted for obtaining conclusions in scientific research. Though not an acute observer of nature, he had the ability to arrange and formulate his facts in an orderly manner, so that they could be presented to the best advantage in his arguments. He was noted for his clearness of perception, judgment, and reasoning, as his mind appears to have been essentially philosophical and possessed little imagination. Being well read, he had an extraordinary ability of gathering together what had been written by others and, through additional arguments, of further developing this knowledge. He became unsurpassed as a clinical teacher; in fact he was the first in Great Britain to present clinical lectures in the English tongue. Though he never became an eminent anatomist or physiologist, or produced an epoch-making discovery, he nevertheless possessed qualities that have placed his name in the forefront of the leaders of British medicine.

William Hunter's mind, on the other hand, was in marked contrast to that of his preceptor. During the five years he had attended the University of Glasgow, receiving instruction from men with strong independent views, his intellectual faculties had been trained and moulded for use in an

entirely different manner from that of the great majority of the Scotsmen of his day. For they, because of the domination of the Established Church, had lost all independence of thought and without hesitation relied upon the clergy for information concerning the natural sciences—information, be it said, that was always tinged with superstition or theological dogma. Hunter had been taught, principally, the importance of an independent mind when in search of knowledge; "the right of the individual to form his own opinions from the evidence at hand." Along with this freedom of thought, he had developed a healthy scepticism and an open mind which, together with a natural curiosity and an extraordinary determination, provided him with the most important of the necessary qualifications for a successful investigator. Though not yet trained in the use of inductive reasoning, he had apparently given up deduction as a means of reaching a conclusion, and was commencing to collect the basic facts in his inquiries in order to have evidence at hand later to prove his point.

William Hunter came to reside with Cullen before he had gained much worldly experience. It is needless to say that he knew nothing whatsoever concerning the art of physic or of surgery, for this he expected to learn through his apprenticeship. Cullen, being but eight years older than his friend, quite naturally adopted an attitude of an older brother towards his pupil. There is much evidence in support of this assumption to be found in the not infrequent letters which were exchanged between them during the years that followed Hunter's arrival in London. There is no doubt that Cullen, who had seen far more of the world than had his young companion and had come through his experiences unscarred, was in consequence able to give much valuable advice to his assistant which may have been of benefit in forming the stalwart character of this impressionable youth. William Cullen was a contemplative, quiet man who possessed the highest ethical and moral standards and whose advice would certainly have been given in the most unobtrusive manner. He was known for his kindness to others, and he enjoyed helping his friends and students in their numerous problems of life. One of his students of a later day writes of his kindliness as follows: "He was cordially attentive to all their interests; admitted them freely to his house; conversed with them on the most familiar terms; solved their doubts and difficulties; gave them the use of his library; and in every respect treated them with the affection of a friend and the regard of a parent."

Though busy with his professional duties and studies, Cullen had found time to interest himself in the civic affairs of the community in which he lived and in consequence had been elected baillie or, as we would term

it, magistrate in the year 1738. In this office he had shortly been called upon to use his authority for quelling a grave disturbance among the farmers, occasioned by the scarcity of grain; an amicable settlement of the differences had been brought about through the wise counsel of this kindly man. Such was the character of the individual who was responsible for launching William Hunter upon his career in medicine.

There is no doubt that the young assistant, as he was called, did little more at first in helping his friend and master than any other apprentice would have done. Perhaps, besides running errands and delivering medicines to patients, he was occasionally permitted to be of assistance in the concoction of some mixture of drugs, the combining of materials into a plaster, or in the administration of a clyster. However, being particularly bright, it is probable that as his knowledge increased he was given more responsibilities. It was in this way that William Hunter learned much concerning the practical side of the profession he was preparing himself to enter. But far more important than this was the knowledge gained by him from Cullen of the method of handling patients; for both of them, it has been said, were adept in the technique of an attractive "bedside manner."

During the long winter evenings, the apprentice was without doubt provided with authoritive medical works to read and digest, for Cullen's library was already large and growing rapidly. Among these tomes was surely Cheselden's work on anatomy, and perhaps Cowper's beautifully illustrated *Anatomy of the Human Body* or his *Myotomia Reformata,* reissued in an enlarged and handsome form under the supervision of Dr. Richard Mead. And undoubtedly much time was spent in contemplating the works of Boerhaave—the *Institutiones,* the *Aphorisms,* and lastly his greatest work, *Elementa Chemiae.* But we can be sure it was not from these written words that William Hunter obtained his real knowledge of medicine, for this was undoubtedly gained at the bedside and later when discussing the cases with Cullen. His mentor, moreover, inspired him to push forward in his career by instructing him in medical history and by pointing out the authorities he should emulate.

Cullen, having decided at about this time to make physic his ultimate career, began giving more time to study, in order to better his knowledge in this branch of medicine. Of this fact his biographer notes: "There is every reason to believe that he was industriously employed in qualifying himself to occupy a situation more favourable for the exercise of his talents. Besides the study of theoretical and practical medicine, the science of chemistry, natural philosophy, and natural history seem to have engaged much of his

attention." It is obvious that Cullen must have welcomed the companionship of another whose enthusiasm and industry were so similar to his own; and in all probability they delved together into the study of chemistry, physics, and natural history, obtaining information which later was to prove of great benefit in furthering their respective careers. Through discussion their mutual interest in medical literature was without doubt aroused, an interest which in later years proved often to be a topic in their correspondence. There is every reason to believe that the younger man supplied the older with much that was new to think upon through expounding views having to do with intellectual freedom that he had imbibed from Francis Hutcheson at the University of Glasgow.

Their close association during these few years was therefore of mutual benefit. The fact that they formed an enduring friendship was quite natural, as their interests and ambitions were very much the same, although their approach to the acquisition of knowledge was from entirely different standpoints. Their letters, covering many years until the time of Hunter's death, bear witness to the deep affection and high esteem in which each held the other. But in these letters, even those that were written when they were advanced in years, the spirit of their former relationship, that of preceptor and pupil, is ever reflected in the form of their salutations: as Cullen begins his letters with "Dear Willie," or in later years, with "My Dear Friend," while Hunter's style of address is invariably more formal, as "Dear Sir" or "Dear Doctor." Many years after parting William Hunter refers to Cullen as the "man to whom I owe most and love most of all men in the world." J. Matthews Duncan remarks in his Harveian Address of April 13, 1876, delivered in Edinburgh: "It has often been remarked that persons of dissimilar character, who have similar aims, live together more amicably than persons of nearly the same character; and this is well illustrated in the life-long friendship of Cullen and William Hunter." It appears that although intellectually opposites, each of them admired the abilities of the other—Cullen as a philosopher and Hunter as an investigator—and having recognized the difference in the other's mentality, each then adjusted himself to the conditions, and in consequence they lived together in perfect harmony.

It would be of interest if it were possible to ascertain the associates of these friends during the time they resided together in Hamilton. Surely it would be worthwhile if we could be informed of their occasional companions, for men of their studious nature and intellectual abilities would certainly have had some professional intercourse with other medical

leaders of prominence in the community. Having but little direct information upon this matter, we must take such facts as we have, and upon these build up what we can through supposition. It is known that there was among Cullen's associates in this farming district a country practitioner, a surgeon-apothecary by the name of William Smellie, who had been established in practice for seventeen years or more in the nearby town of Lanark, some seventeen miles distant from Hamilton near the Falls of the Clyde. Smellie, who at the time was forty years of age, had been in practice since 1720, during much of which period he had been an "unqualified practitioner," for his name, it is discovered, was not entered upon the "Roll" of the Faculty of Physicians and Surgeons of Glasgow until the year 1732–33. Though a very much occupied man, having built up a large general practice covering an extensive field of operation (as many of his patients resided on farms at great distances from Lanark and the means of transportation in this country district was difficult and time-consuming), he nevertheless appears to have made opportunities in which to improve his knowledge through study. As evidence for this there is a letter, in which we find him writing to "Baillie Cullen, Surgeon in Hamilton," in the year 1738: "I have your book on consumption too long, but I shall send it next week. Send me up Dr. Clifton's History of Medicine; I want to see some things in him. I could not get that book from Glasgow or Edinburgh, but I have sent to London for it." Though in general practice, Smellie was showing an unusual interest in the much neglected practice of midwifery, which was then almost entirely in the hands of ignorant midwives. He had, in consequence, acquired considerable reputation for his skill in handling difficult cases of childbirth. Having many of the same aspirations and interests as those of his friend, Cullen, and being frequently called by his duties to the vicinity of Hamilton, it is not at all unlikely that he had many opportunities of meeting his colleague so that they might discuss their common interests, and it would appear that on some one of these occasions he must have made the acquaintance of Cullen's young and enthusiastic pupil.

It is not at all improbable that William Hunter also formed his friendship with Tobias Smollett during these years, or possibly he renewed one that had been made at an earlier date while they both were students at the University of Glasgow during the session of 1735–36. Such evidence as we possess for this is purely circumstantial. It is known that while Hunter resided with Cullen, Smollett was apprenticed to John Gordon of Glasgow, an old friend of Smellie and probably the master under whom he had

studied while preparing himself to enter the profession. Gordon, it appears, was much respected by the practitioner of Lanark who refers to him as "my old acquaintance, and senior practitioner in the art of midwifery." William Cullen must have also known Gordon, for the latter's name appears upon the "Roll" of the Faculty of Physicians and Surgeons of Glasgow under approximately the same date as that of John Paisley to whom, as we know, Cullen had been apprenticed for a short time. We further find that an intimate friendship developed later between Smellie and Smollett, and that the latter prepared the manuscript of the former's great work, *The Theory and Practice of Midwifery,* for the press and supervised its publication in the year 1751. And, finally, they both left Scotland for London at about the same time during the latter part of the year 1738. Of this fact Smellie's biographer writes: "Whether, then, their leaving the West of Scotland in the same year was in company or not we cannot definitely determine, and probably will never be in a position to tell; but we are inclined strongly to the belief that it was about this time that the acquaintanceship was formed, and that the medium of it was none other than John Gordon." From the facts that have been cited, it seems that there had been ample opportunity for William Hunter to have become acquainted with Tobias Smollet before the latter's departure for London in the autumn of the year 1738.

Joseph Adams, the biographer of John Hunter, presents us with the following first-hand description of William Hunter: "His person, though small, was graceful; his cast of features regular and interesting; his voice musical; his manners attentive and flattering." Cullen, in writing to Dr. Samuel Foart Simmons some forty-five years later, soon after William Hunter's death, describes his former pupil in these words: "His conversation was remarkably lively and agreeable, and his whole conduct at the same time more strictly and steadily correct than that of any other young person he had ever known."

Satisfied with their association of more than two years, Cullen and Hunter agreed that they would form a partnership; the former to confine himself to the practice of physic, while the latter was to take up surgery. In consequence it was decided that William Hunter should prepare himself for his duties in this joint undertaking by attending the lectures of Alexander Monro for a year at Edinburgh and finally by visiting London.

Samuel Foart Simmons tells us that: "He [William Hunter] set out for Edinburgh in November 1740,* and continued there till the following spring, attending the lectures of the medical professors and amongst others

* Simmons is in error by giving this date, for George Peachy has conclusively shown that it was in the autumn of 1739, not 1740, that William Hunter "set out for Edinburgh."

those of Dr. Alexander Monro, who many years afterwards in allusion to this circumstance styled himself his 'old master.' " This is all that William Hunter's earliest biographer has told us of his attendance, during a full session, at the medical school of the University of Edinburgh, and succeeding ones have added little more to his meager account.

On his arrival at the University, William Hunter found himself to be one of a class of 137 young men who had come to attend the course of lectures given by Alexander Monro. It may be assumed, I believe, that the young student was the bearer of a letter, written by his friend and master, William Cullen, introducing his protégé to this, the most important member of the faculty of the newly founded school of medicine. This would seem to be probable as Cullen had been one of Monro's most intelligent and promising pupils but a few years before, and it is well known that the vigorous and stalwart professor was "a most admirable and lovable man; sincere, modest, without jealously, benevolent, kind to his students; an able and placid man." And added to all this, we are informed by a former pupil, the eminent physician John Fothergill: "Professor Monro's class soon became numerous; and the anatomy of bones, of nerves, and his other pieces, will long remain as testimonies of his great abilities, when the greatful regard of the multitude of those who studied under him, and were witnesses of his singular attention to instruct and encourage his pupils, as well as to act the part of a parent to every stranger, fails of expression."

Alexander Monro had, it appears, been brought up from the time of his early youth with the expectation of some day becoming professor of anatomy at the University of Edinburgh. After he had shown particular application and aptitude as his father's apprentice, his father, John Monro, a truly canny Scotsman, had then sent him to London, so that he might receive instruction in natural philosophy and in anatomy. Here he had come under the tutelage of the well-known anatomist and surgeon, William Cheselden, who was then still a young man. Cheselden not only instructed him in the newer methods of teaching anatomy but also introduced him to the recently discovered art of making anatomical preparations. Having remained in the English capital for little more than a year, young Monro had then moved on to the Continent where, following a visit to Paris, he had enrolled himself among the students at Leyden, in order, it is said, that he might study under Boerhaave. Though there is no record of his having studied, while in the Netherlands, under Frederik Ruysch, who had been foremost in developing the art of making anatomical preparations, it is evident that he learned much concerning the technique employed by this famous anatomist who was at about that time injecting the

vessels with colored wax in order to define them—an art in which Monro later became most proficient.

Returning to Edinburgh sometime in the autumn of the year 1719, Alexander Monro found that through the influence of his father he had been appointed during his absence to the position of Professor of Anatomy at Surgeons' Hall.

> Soon after his appointment [writes his son, Donald Monro], his father prevailed upon him to read some public lectures on anatomy and to illustrate them by shewing the anatomical preparations which he had made and sent home when abroad; and without his knowledge, invited the president and fellows of the college of physicians, and the whole company of surgeons to honor the first day's lecture with their presence.

This lecture proved so successful that young Monro's reputation as an anatomical teacher was apparently at once established, and within a few months' time he received a notice of his election by the Town Council to the office of Professor of Anatomy at the University, an office which he set out to make more active than had the former incumbents of this chair who had been little more than figure-heads. Therefore, together with other young men like himself fresh from the environment of Leyden, they commenced to present organized courses in medical subjects which were later taken over by the University. Thus, John Struthers points out:

> The Medical School of the University was formed by the transference of the school which Monro had gathered round him in the theatre in old Surgeons' Hall. . . . . He had to do a new thing in Edinburgh; to teach anatomy, and to provide for the study of it, in a town of then only thirty thousand inhabitants, and in a half civilized and politically disturbed country; he had to gather in students, to persuade others to join with him in teaching, and to get an Infirmary built. All this he did, and at the same time established his fame not only as a teacher but as a man of science, and gave a name to the Edinburgh school which benefited still more the generation which followed him. This really great and good man, therefore, well earned the title, often given him, of the father of the Edinburgh Medical School.

From this we learn the character of the man who became William Hunter's teacher and later his literary adversary, and who, notwithstanding their differences, remained his friend throughout it all.

The course of lectures on anatomy and surgery, which commenced in October and was concluded in May, was opened by Professor Monro with an introductory lecture in which a synopsis of the history of anatomy was presented to the newly arrived students. There then followed lectures on anatomy which were illustrated with demonstrations of the bones, of dissections, and of preparations of the human body, together with others of some of the lower animals, in order, it is said, that a comparison might be drawn by the student between them. On completion of anatomy, Monro

spoke upon the surgical conditions that commonly occur in particular regions of the body, and continued by describing the operations that would be required in their treatment. It should be mentioned that though he taught surgery, Alexander Monro was not at any time an active practitioner in this field of medicine, for he left operating to others and confined his practice to the care of nonoperative conditions and to physic. Having described and demonstrated the application of bandages and the use of mechanical devices in the treatment of common deformities, he concluded the course by lecturing on the little known subject of animal economy, which is better known to us today as physiology.

The matter touched upon in these lectures was entirely new to William Hunter who had not previously had the opportunity of acquiring knowledge in the fundamental subjects of medicine except for what he had obtained from books; for during the previous three years the only practical instruction he had received had been in physic and surgery. Now, however, he was able to see for the first time in his life the muscles, the abdominal and thoracic viscera, and the brain as these parts were demonstrated to him and his fellow students during lectures upon a freshly dissected body. But none of these structures could be handled or investigated by him, as he and his fellow students were required to sit quietly on forms at some distance from the prepared dissection that was being shown to the class. More difficult to see and understand were the minute vessels and nerves in the bodies of infants which were used to demonstrate this part of anatomy. In later years, William Hunter writes of his early experiences when learning anatomy as follows:

> In the course of my studies, I attended, as diligently as the generality of students do, one of the most reputable courses of Anatomy in Europe: there I learned a good deal by my ears; but almost nothing by my eyes; and therefore, hardly any thing to the purpose. The defect was, that the professor was obliged to demonstrate all the parts of the body, except the bones, nerves, and vessels, upon one dead body. There was a foetus for the nerves and blood-vessels; and the operations of surgery were explained, to very little purpose indeed, upon a dog.

The winter session spent at Edinburgh, was, however, not without benefit to William Hunter, who, though he had not obtained all the knowledge that he had expected, was stimulated with a genuine desire to learn more of the structure of the human body than he had been able to acquire by attending this course. I think we may assume that during this year while studying under Alexander Monro he received an incentive to further his studies in this subject, a sincere wish to acquire more knowledge of the structure of the body by dissecting it himself. It is possible that he commenced to realize at this time the importance of such investigations for

discovering facts which might further increase his knowledge concerning the body during both health and disease. At least he told his students some years later that:

> The more we know of our fabrick, the more reason we have to believe, that if our senses were more acute, and our judgment more enlarged, we should be able to trace many springs of life, which are now hidden from us: by the same sagacity we should discover the true causes and nature of diseases; and thereby be enabled to restore health of many, who are now, from our more confined knowledge, said to labour under incurable disorders. By such intimate acquaintance with the economy of our bodies, we should discover even the seeds of diseases; and destroy them, before they had taken root in the constitution.
>
> This indeed is a pitch of knowledge which we must not expect to attain. But surely we may go some way; and therefore let us endeavour to go as far as we can. And if we consider, that health and disease are the opposite of each other, there can be no doubt, that the study of the natural state of the body, which constitutes the one, must be the direct road to the other.

Besides his introduction to the science of anatomy, William Hunter learned the underlying principles of making anatomical preparations, an art in which he was to become a master. For proof of this, one need but visit the Hunterian Museum at the University of Glasgow where preparations made by his hands two hundred years ago are still found on display in perfect preservation, with colors of injected vessels as vivid as they might have been when first fashioned.

William Hunter may have thought, even at this time, of eventually making the teaching of anatomy a career, for Alexander Monro is said to have been an inspiring lecturer who spoke easily in the most convincing manner without the use of notes, and being the idol of all his students, it is known that he awakened within the minds of many of them a desire to follow in his footsteps. And today he has the reputation of having prepared a larger number of students for teaching anatomy than had any previous man.

William Hunter came to know and admire his kindly master, and a sincere friendship with mutual respect developed between them. So highly did the older man hold the ability of the younger that when his two sons were ready to enter the practice of medicine he sent them to London so that they might attend William Hunter's lectures as a finishing touch to their education.

William Hunter completed his studies at the medical school in the month of May 1740, but Peachey says "he probably remained in Edinburgh for the summer courses, and then after bidding farewell to his parents, he set out for London."

Mississippi Midwives

JAMES H. FERGUSON*

I. The Organization

IN 1947, midwives attended 23,815 (36 per cent) of the women who bore children in Mississippi. Numbering 2,192, only 35 of them white, the midwives play no small part in the maintenance of maternal health in the state. The training program, regulation, and licensing of these midwives by the State Board of Health have undoubtedly contributed to the 47 per cent decline in the maternal death rate in the past ten years.

Delivery at home by a midwife is not proposed by anyone as an ideal arrangement. However, "the midwife problem" will continue to exist until enough facilities are available in rural areas to provide better care for all maternity cases. Workers familiar with the available medical services in the South recognize the indispensability of the midwife, at least for the present. Wide areas will have to be relieved of their current gross inadequacies in physicians, nurses, and hospital beds before we can set about to discard the midwife. Fifty-eight per cent of the births in Mississippi are taking place in the home.

Before the present state supervision was established, the midwife practised as she pleased. She conducted deliveries as she had seen her neighbors and older midwives conduct them. She was often physically and mentally unfit to perform this function. Her relationship with organized medicine consisted usually of nothing more than a half-awareness of the activities existing between her and the local physician. When the patient was in too obvious distress, the doctor was summoned. A technique of assistance at childbirth and the care of the newborn baby had not yet been broached to hamper the midwife. In its place she had her superstitions—possibly the hatchet on the bed to cut the miseries in half or the husband's hat donned by the travailing woman to hasten the birth. Some beliefs were amusing, others laden with danger.

In some counties the majority of white women were being attended by midwives either because of the lack of doctors or by preference. Because of poor roads it was impossible for physicians to reach all cases. There was no alternative in those instances but to call the neighborhood midwife.

Until more hospitals and more doctors came into existence the only way

* New Orleans, Louisiana.

to improve the situation seemed to be to gain supervision over midwives by requiring a license to practise. The two major requirements were to be the maintenance of cleanliness of equipment and person and the summoning of a physician when an abnormality appeared before, during, or after parturition. It was an attempt to make the best of a bad situation. No other course seemed possible. The State Board of Health has never allowed the vision of some day eliminating the midwife to be obscured. In large eastern cities the problem was being resolved by vehement condemnation of the midwife and by the provision of accommodations for all those who engaged midwives, either from tradition or economic necessity, to be delivered in large, well-appointed hospitals at public or charitable expense. This solution was obviously not open to Mississippians.

In 1921–1922 a State Supervisor of Midwives organized the midwives for the first time on a state-wide plan in what was then a novel effort to lower maternal and infant death rates.[1] The number of midwives actively engaged at that time was 4,209. Ninety per cent could not read nor write. Ninety-nine per cent were Negroes.

The Negro midwives, being natural nurses, proved tractable, teachable, and eager to learn "the white folks' way." The less sophisticated rural midwife never acquired the reputation of abortionist as did her urban sister. In 1914 in Newark, New Jersey, thirteen of the city's ninety-odd midwives were being watched as abortionists. The abortionists of today in New Orleans keep an unbroken succession of beds in the Charity Hospital occupied with critically infected women.

The old Negress in dirty nondescript dress, a pipe stuck in her mouth, and a few odds and ends of equipment thrown into a paper shopping bag or a drawstring cloth sack began to be replaced by a cleaner woman in a white starched dress and a white cap carrying a neat black leather bag which contained a carefully scrutinized set of supplies.

The periodically impassable roads of the day and lack of enthusiasm on the part of some county health officers and practitioners made progress slow for the Supervisor. Many, feeling that the midwife situation was unreclaimable and that nothing could be done with these women, were openly opposed. So many were aged, decrepit, and influenced by superstition that the possibility of improvement must indeed have seemed dim. More farsighted men, realizing there were simply not enough medical men to reach all of the women who were to bear children, with no prospects of immediate improvement, accepted regulation of the midwives as a necessity, if a makeshift one.

[1] See *Mississippi State Board of Health Biennial Report*, 1919–1921; also 1921–1923.

The midwives were investigated and instructed in the new standards that were expected of them. All were impressed with the imperativeness of calling a physician if an abnormality was recognized. Cleanliness was emphasized. Simple ways properly to prepare materials needed during delivery were taught. The use of the wax silver nitrate ampules, supplied by the State Board of Health, was demonstrated. Improvement was slow and at times discouraging. Illiteracy and ignorance were the principal obstacles, but gradually the importance of using boiled water, the necessity for cleanliness, and the ban on digital examinations began to be understood.

The health of the midwife herself was made a matter of concern. She was given a physical examination and defects corrected whenever possible. She had a blood test. Prophylaxis against typhoid fever and smallpox was carried out. There were other standards to be met if the midwife corps was to be bettered, and a certificate of practice was granted only after certain vital points were satisfactorily investigated: personal character and intelligence, a clean person and home, possession of instruments or drugs which were debarred from her use, general standard of her work in the community, and her record for reporting births to the proper authorities.

Some midwives lived in such backwoods areas that news of the change in their status did not reach them for years. The following is the Nursing Division's report of the trials in licensing one midwife.[2]

Minerva P., reported by a midwife club leader to the state supervisor as a midwife practicing without a permit, was referred to the public health nurse in Jefferson County.

After many inquiries, in a twenty-five mile circuitous ride in the attempt to locate Minerva, the public health nurse was told the plantation on which Minerva lived, due to high water, was an island and it would be necessary to go to Natchez, cross the river twice, the trip covering 125 miles.

The public health nurse then wrote Minerva to come to the health center in Fayette on Saturday. The following Friday, April 4, 1939, Minerva left home at 4:30 A.M., on mule back with equipment securely fastened in an oilcloth bag which in turn was tied to the crocus sack which served as a saddle. She was so excited over the summons she was unable to eat a bite, but did take meat and bread to eat on the way. Most of the day she rode through water and near dusk it was necessary for the mule to swim across a swollen creek. Becoming entangled, the mule floundered throwing Minerva into the water.

A man living on the opposite side of the creek heard a woman scream and when he rushed down and finally succeeded in getting her free and on dry land he realized it was his sister he had rescued. He was rewarded for his labors as Minerva slowly opened her eyes and her lungs functioned. Though the mule was spared, her food

[2] This account is taken from a typewritten report found in the scrapbook of the late Miss Mary D. Osborne, a prominent and beloved figure in Mississippi medicine, who served as Supervisor of Public Health Nursing from 1919 to 1946. Her scrapbook is now in the possession of the Division of Nursing, Mississippi State Board of Health.

was gone and the sister-in-law was such a poor housekeeper Minerva was unable to eat in the midst of the filth. The next morning she hired a car to bring her 21 miles to Fayette, paying the driver $4.50.

In obtaining the history, the nurse learned the nearest physician to this midwife was 50 miles away on one side and 30 on the other, through water most of the way. No other midwife lived within 10 miles, even when the water was down. Minerva had been unaware of supervision offered by the State Board of Health or instruction given by the public health nurse and she was engaged to care for four expectant mothers. Completing the history, blood was taken for a Wassermann test. Minerva insisted on watching the procedure and as the tourniquet was released she mumbled she felt faint and fell unconscious. Restoratives were applied and a physician who was called administered stimulants by hypodermic and after rest and food Minerva returned home.

Report of Wassermann taken April 5, 1939 was positive. By May 5, 1939 Minerva was under treatment of a private physician. When the water went down and the nurse was able to visit the plantation Minerva had a large group assembled. There were several pregnant women to receive instruction, many were protected against smallpox and typhoid fever and infants and preschool children were protected against diphtheria.

April 24, 1940, Minerva came to the county meeting to have her permit renewed. Her equipment was clean, complete and sterile, and during the past year she had been given neoarsaphenamine and bismuth regularly.

The Midwife Permit is renewed each year, subject to a record of cooperation and conformance to the rules regulating her activities. New midwives are accepted after a period of training under an experienced midwife and instruction by the public health nurses.

To continue and expand this improvement in the education of midwives, public health nurses met with groups and individual midwives and followed an intensive type of demonstration and instruction. This work has never been interrupted. In many counties a continuous schooling is accomplished by requesting the midwives to attend in rotation the health department maternity clinics. The midwife prepares the patients for examination and assists the doctor and nurses in whatever way she is able. She is present when the patient is given sound advice on hygiene peculiar to her state. She hears up-to-date dietary information offered. Some of the material presented in the maternity lecture course must be absorbed. Every little bit that can replace her own, often fantastic, notions is something gained.

The organization, which at the present time supplies a self-sustaining program of education for the midwife, is the Midwife Club. Each county or district within the county, has such a Midwife Club which meets regularly, usually monthly. There are at present 410 of these organizations active in the state. A club has a Leader and a Secretary who have been trained by the public health nurses in order to be able to continue the work without

assistance. The Leader presides at the meeting, inspects the midwives' bags, and dispenses the wax ampules containing the silver nitrate eye drops. She is responsible for new members learning the revered Midwife Song and forwards to Jackson a report of the meeting. The duties of the Secretary are to call the roll, keep minutes of the meeting, and read the midwife's manual to the assembly. Usually one page is selected, read slowly, and elucidated in the vernacular.

Observers who have had an opportunity to follow the development of the Midwife Clubs vouch for the improvement of the members and of their work. Meetings have become very business-like affairs with good attendance records. Instruction provided is assimilated into their practices. Younger, more intelligent Negro women have joined. The ratio of literacy to illiteracy has been reversed since the foundation of the movement. Many midwives are leaders in their neighborhoods and play an active rôle in other community health programs. These factors can be depended upon to result in improved care for the woman who has to rely upon this type of maternity service.

In a survey now in progress of maternal deaths in Mississippi the first thirty consecutive deaths investigated revealed that in no case could a midwife be indicted for negligence. The same survey is disclosing that the most important single element behind Mississippi's high maternal death rate is a lack of antepartum care. The midwife has proved herself persuasive in getting the Negro women to the health department clinics and the private practitioners for this care. She has contact with the type of woman who does not know the value or existence of antepartum care. To know who is pregnant in nearby families is her bread and butter. She is a leader in her community. She gets the women out for the clinics. This is enforced in some counties by forbidding the midwife, on the penalty of losing her permit, to attend a woman in labor unless the woman has procured a slip from the health department or a private practitioner stating that she has been examined, has had her blood tested, and has been judged a person who can, with reasonable safety, be attended by a midwife. Reporting of existing unregistered cases has become an important part of her duties. When a prospective mother fails to report, a public health nurse makes a home visit. The nurse discusses the importance of coming to the health department, being examined, attending the maternity lecture course, and returning for periodic visits. While this discussion goes on, the patient, almost without realizing that she has had a check-up, has been weighed on a portable scale, a urinalysis has been done, her blood pressure recorded,

and a specimen of blood collected. She usually appears on the next clinic day. The practice of midwifery at times seems almost to confer longevity. Not a few of these women are still practising when they have grown infirm and acquired impaired vision and hearing. When the time arrives for the elderly midwife to be prevailed on "to step down" and allow younger ones to carry on her fine work, retirement is eased by the presentation, often with a ceremony, of a large and impressively red badge stating that she is a "Retired Midwife." This is proudly worn to church and social functions for the remainder of her days.

II. THEY MEET[3]

When Doctor O'Neil arrived in Hattiesburg to complete his orientation in the midwife program, it was the day of a county midwife meeting. He was escorted to this ten o'clock gathering by Miss Simpson, the County Nursing Supervisor, and Nurse Hawkins, colored public health nurse. The meeting was held at the True Light Baptist Church, an ancient looking frame structure which seated about one hundred. Windows of colored glass, interspersed in places with panes of plain glass, allowed enough sunlight to provide an ecclesiastic dimness. The hymns for last Sunday were numbers 247, 139, and 87. About the walls were scattered placards designating the stations of the Sunday School classes. Behind the pulpit, an iron pipe railing guarded a concrete baptismal tank. Concrete steps led down to its seven-foot depth. It measured approximately twelve square feet.

As this meeting was a county assembly of the midwives and included three districts, each with its own Midwife Club, two of the Leaders and one Secretary shared the honor of sitting facing the sixteen others. The Leader who had assumed charge initiated the proceedings with, "get your books out," and each produced a copy of the Manual for Midwives, insuring that the words to the Song of the Midwives were going to be sung correctly. The Leader sang the first three or four words of each stanza alone, giving the pitch and helping to keep the place. The others followed closely and loudly.

SONG OF THE MIDWIVES

(Tune: "As We Go Marching On")

We aim to be good midwives of the state,
We try hard to be up to date.

[3] Report of a meeting attended by the author in October 1948. A phonographic record of the entire proceeding has been preserved.

To be on time to meetings, and never be late,
As we go marching on.

Chorus:

Glory, glory, hallelujah,
Glory, glory, hallelujah,
Glory, glory, hallelujah,
As we go marching on.

We tell our mothers they should breathe fresh air,
We show them what they need to prepare,
We teach them what the baby should wear,
As we go marching on.

Chorus:

We tell them plenty of water to drink,
About good food we cause them to think,
We say, when tired, take of sleep a wink,
As we go marching on.

Chorus:

We put water in a great big pot,
We know of this we must have a lot,
We boil it all, use some cool, some hot,
As we go marching on.

Chorus:

We put drops in the baby's eyes,
Whether the mother laughs or cries,
The State for us the eye drops buys,
As we go marching on.

Chorus:

We report births and deaths of all,
When anything is wrong, we the doctor call,
We hope we never from grace may fall,
As we go marching on.

Chorus:

We wear clean dress, clean cap, clean gown,
We have clean homes, clean yards, clean town,
We'll make OUR COUNTY OF GOOD RENOWN,
As we go marching on.

Chorus:

OUR COUNTY midwives are the best in the state,
They try hard to be up-to-date;
Are on time for meetings, and never late,
As they go marching on.

Chorus:

The second Leader stood and bent over the presiding table on which rested a book of prayer. The scripture was haltingly read as if she had not taken the trouble to practise or someone else had just selected it. When she stumbled, the other Leader supplied the pronunciation. It was apparent who had selected the day's scripture. But when the reader straightened up and ad libbed a few lines of scripture of her own at the end, fervently interpreting the text, the words flowed. It seemed, on summing up, that "we are here today because the Lord allowed us to be."

Next, all sang "Does the Lighthouse Shine on Me." No pitch or guide was needed for this one. This hymn seemed to be just long enough to allow each singer to inject into one stanza a fortissimo variation. This song was followed, apparently spontaneously because no one announced it, by "This Little Light of Mine." (Yes, that was a little boogie woogie Dr. O'Neil heard in that one. He thought he must have been mistaken at first.)

The announcement was made that the next part of the program was to be "The Midwife Song." All arose from the pews and at the end of the church formed a large circle facing its center so that they might watch each other as they sang with broad gestures and loud rhythmical clapping.

MIDWIFE SONG

(Sung to the tune of "Mary Had a Little Lamb," with motions to fit the words)

Why does the midwife wear a wash dress? (*Hold dress*)
Wear a wash dress, wear a wash dress?
Why does the midwife wear a wash dress?
To PROTECT THE MOTHER AND BABY. (*Claps hands*)

Why does the midwife wear a clean cap? (*Points to cap*)
Wear a clean cap, wear a clean cap?
Why does the midwife wear a clean cap?
To PROTECT THE MOTHER AND BABY. (*Claps hands*)

Why does the midwife wear a clean mask? (*Puts hands to face*)
Wear a clean mask, wear a clean mask?
Why does the midwife wear a clean mask?
To PROTECT THE MOTHER AND BABY. (*Claps hands*)

Why does the midwife wear a clean gown? (*Holds out arms*)
Wear a clean gown, wear a clean gown?
Why does the midwife wear a clean gown?
To PROTECT THE MOTHER AND BABY. (*Claps hands*)

Why does the midwife clean her nails? (*Cleans nails*)
Clean her nails, clean her nails?
Why does the midwife clean her nails?
To PROTECT THE MOTHER AND BABY. (*Claps hands*)

Why does the midwife scrub her arms?
Scrub her arms, scrub her arms?
Why does the midwife scrub her arms?
TO PROTECT THE MOTHER AND BABY. (*Claps hands*)

Why does the midwife scrub her hands?
Scrub her hands, scrub her hands?
Why does the midwife scrub her hands?
TO PROTECT THE MOTHER AND BABY. (*Claps hands*)

Why does the midwife soak her hands? (*Soaks hands*)
Soak her hands, soak her hands?
Why does the midwife soak her hands?
TO PROTECT THE MOTHER AND BABY. (*Claps hands*)

Why does the midwife make paper pads? (*Measures pad*)
Make paper pads, make paper pads?
Why does the midwife make paper pads?
TO PROTECT THE MOTHER AND BABY. (*Claps hands*)

The next in order of procedure was a demonstration of preparations for the coming of the baby. It was assumed that the Leader had already washed her hands. She arrayed herself in a spotlessly white gown that she drew from her bag. She then fashioned a headdress from a square of muslin and completed the investiture with a home-made surgical mask. Some further description of the preparation was lost to Dr. O'Neil as the Leader mumbled into her mask. However, there was no mistaking the rubber tubing and funnel which appeared as other than paraphernalia for an enema. When the young acting secretary removed the bowl of flowers from the table and lay down on her left side, drawing up her knees, Dr. O'Neil began to look nervously toward the nurses—and the exit. He speculated on the propriety of remaining. Although a physician, he had not become so calloused that he could accept with equanimity what gave prospects of being a social enema. But the Secretary hopped up from the table and the tension was relieved.

"We will now get up and have 'scrubbing' our hands." A circle was formed again and, following the Leader, they gravely went through the motion of scrubbing the left upper extremity, using the knuckles of the right hand as a brush. In turn each side of the fingers, several parts of the hand, wrist, and forearm were selected and they massaged each region with ten vigorous strokes while they counted aloud in unison to ten.

Miss Simpson was invited to speak to them. She briefly passed on to them comments on their work by a Hattiesburg doctor. While calling on a patient he had heard that a midwife was "waiting on" a woman next door.

Out of curiosity he paid a visit and was so agreeably impressed by the set-up that he felt impelled to mention it to the next public health nurse he met. After these compliments were extended, Miss Simpson announced, "We are very fortunate to have here today with us Doctor O'Neil from the State Board of Health in Jackson, who is going to make a talk to you. Doctor O'Neil."

I am very happy to have the opportunity today to address the Midwife Club of Forrest County. I have heard a good deal about the fine work you are all doing down here, taking such good care of your pregnant women. I want to congratulate you.

I would like to show you a map that I think you all will be interested in. [A map of Mississippi is projected on a portable screen. The map is divided into counties and on it appear colored dots, yellow, red, green and blue.] Now, this here is a map of Mississippi. Here's Hattiesburg and here's Jackson. Away down below here some place is New Orleans. Do you see where we are? (*Yassah.*) Now each one of these dots means that a woman died having a baby in 1947. Now that's a lot of dots, isn't it? (*It shore is.*) That's too many. A lot of these women did not have to die. (*That's right.*) There are 176 dots. That means that 176 women died in 1947 in Mississippi from having babies. Now, do you see those yellow dots? (*Yassah.*) There are seventy-six of them. These women had what you hear the public health nurse calling 'toxemia' when you come to help at the health department. That's when the woman has high blood and swelling of the legs and the urine test is bad, and you know that's bad. (*It shore is.*) Each one of these women probably had convulsions or fits and then died. How many of you have seen a pregnant woman with fits? Raise your hands. [About half of the midwives raise their hands.] You know that when a woman in your district has that trouble she has to pay particular attention to what the doctor says or she's going to be in a bad way. (*She shore is.*)

And these red dots mean that these women bled to death. There are thirty-six of them. Maybe some midwife didn't call the doctor when she saw bleeding and she knew she should. (*She shore did.*) You women know that when a woman has had any bleeding, before or after the baby comes, you must send for a doctor immediately. (*We shore does.*)

And now these green dots mean that this many women died of infection and fever. And how did the women get an infection? They got an infection because the midwife did not keep things clean the way she was taught by the health nurse, the way it says in the Midwife Manual. Maybe some midwife forgot to wash her hands or to keep the things in her bag clean. Possibly some midwife did the worst thing she can do and examined a woman internally and you know how terribly wrong that is. (*We shore does.*) Now, that's all I want to say this morning. I know that the midwives in this county are going to help us to have less and less dots on this map every year. You keep up your good work and do as the doctors and nurses tell you and I know you will.

Word was passed to prepare for inspection of the midwives' bags. Each member opened her bag and laid out its contents on a pew. Each cloth article was starched and ironed to a whiteness seldom seen in hospital supplies. The entire display was impeccably clean. The nurses and Leader went down the aisle checking each piece of equipment.

Inner bag of white washable material
Cap, mask, and gown
Hand brush
Wooden nail cleaner
Blunt scissors
Bottle of synol soap
Bottle of lysol
Silver nitrate, 1 per cent in ampules
Sterile tape to tie cord
Sterile band and cord dressing
Sterile eye wipes
Mouth thermometer
Funnel with rectal tube
Manual for Midwives
Midwife permit pinned in last page of manual
Birth certificates
Leather bag to keep inner bag clean

When everything was returned to the bag the congregation rose and sang, "Blest Be the Tie That Binds."

All stood with bowed heads and heard the Leader repeat the prayer of the midwives.

> Our Father who art in heaven, we are gathered here today to make another step forward and pray Thy help to learn how to better care for mothers and babies.
>
> We ask Thee to teach us to do our job well, in order that each mother will have her baby, and each baby its mother, and that they will be well and happy.
>
> We thank Thee that every child, regardless of race, color or creed, wherever he may live under the American flag can have a clean healthful place for his birth and the mother can receive good care before birth of the baby, at birth of the baby, and after the baby comes. And may it be Thy divine will that through the instructions we receive in these health measures childbearing will be safer.
>
> We pray for every child, good health from birth through life, and we pray that as we strive we will faithfully share our part of this service for better mothers and babies. All these things we pray in His name. AMEN.

With that the meeting was adjourned.

"Dr. O'Neil," said Miss Simpson, "this is Patsy, our oldest midwife. Patsy reads palms. Patsy, come here and tell Dr. O'Neil's fortune."

Notes and Queries

Edited by RALPH H. MAJOR, M.D.*

A Contribution to the Prehistory of Aphasia

The history of those puzzling disorders of language which are called aphasia dates from the discovery by P. Broca in 1861 of specific areas in the brain, lesions of which are associated with speech difficulty. This led to the conclusion that the faculty of speech depends upon the integrity of definite regions of the cerebral mantle. When Wernicke in 1874 disclosed an area which seemed to "contain" the engrams for the understanding of language, the way was opened to what Henry Head called the era of the diagram-makers in the theory of aphasia.

It was associational psychology as developed by David Hartley, David Hume, Moses Mendelssohn, and other philosophers of the eighteenth century that formed the background of anatomical theories from Broca to Kleist. Indeed, there seemed to be a complete parallelism between such units as nerve cells as the depositories of engrams, and nerve pathways corresponding to the psychological associations. At the beginning of the twentieth century, however, the psychological assumptions were proven inadequate, and about the same time the purely anatomical theories of aphasia also crumbled.

In his recently published paper, "The Early History of Aphasia," Walther Riese rightly states that the problems involved in aphasia appeared in their totality with almost explosive suddenness. That this is true I want to show through a "piece of knowledge" not mentioned by Riese but which in fact precedes by fifty years the oldest examples quoted by him. It is contained in the first and eighth volumes of the *Magazin zur Erfahrungsseelenkunde*.[1]

In the first volume (1783) a letter written in 1772 by Oberkonsistorialrat Spalding (high official of the Prussian Protestant Church) was published.[2] This document describes a case of transitory sensory motor aphasia with disorders of writing and speech which lasted only about half an hour. In the same year and in

* Department of Internal Medicine, The University of Kansas School of Medicine.

[1] In a letter to the writer, the late Ernst Cassirer describes the *Magazin* as: "important not only for the history of psychology but for the history of the German mind in the 18th century. Carl Philipp Moritz [the editor and founder of this *Magazin*] belongs to those thinkers and writers who, as few others, has partaken in all the movements of the German mind and has reflected its basic interests and tendencies." Other leading contributors and editors were men like Salomon Maimon, a Lithuanian Jew who came to Germany and later became the student of whom Immanuel Kant said: "He is the only one who understood me." Another contributor was Moses Mendelssohn. The aphasia theories of these thinkers will be taken up within the article.

[2] There is a 3-line reference to this publication in Bonvicini's book. Obviously the author has had some knowledge of the existence but has not himself read the magazine because the data which he gives are wrong.

the same journal Moses Mendelssohn published an analysis of this case. In the eighth volume Marcus Herz, a well-known Berlin physician of the time, published another case where, following complete inability to speak, there developed a state in which the patient was unable to pronounce words clearly, either of his own will or when he was asked to repeat words spoken to him. He could, however, read very well either printed or written matter. When he did this there was no disturbance of his speech. If one took away the material from which he had just read, he was again unable to pronounce a word. A case, which he re-

ΓΝΩΘΙ ΣΑΥΤΟΝ

oder

Magazin

zur

Erfahrungsſeelenkunde

als ein

Leſebuch

für

Gelehrte und Ungelehrte.

Mit

Unterſtützung mehrerer Wahrheitsfreunde

herausgegeben

von

Carl Philipp Moritz.

Erſten Bandes erſtes Stück.

Berlin

bei Auguſt Mylius 1783.

Title-page of the *Magazin zur Erfahrungsseelenkunde*, edited by Carl Philipp Moritz, 1783

garded as similar, was also described by Herz in the same publication. The similarity is, however, only an apparent one. Here a melancholy young woman became completely mute, so that the situation is quite different from Dr. Herz' organic case where the patient could and did spontaneously utter blurred phonemata. The lady was able to read normally. It is really striking that a good observer like Herz should not have noticed the difference in these cases.

First I want to give a somewhat shortened translation of Spalding's letter as written on January 1, 1772:

This morning I had to talk in quick everchanging succession to many people; I had to jot down various unconnected trifles, and my attention had to go continuously to different things. The last thing was a receipt which I had to write for monies for the poor of the church community. I sat down and wrote the two first words that were required; but in that moment I was not able either to find the following words in my mind (*Vorstellungskraft*) or to carry out the necessary strokes with my pen. I strained my attention to the utmost; I tried to print very slowly one letter after the other, looking back continuously to tion that come so readily to my mind. I recognized them to be true and firm and I said to myself that these were not the letters which I wanted; not in the least could I imagine what really was wrong with them. I stopped therefore and motioned the man who was waiting, partly in monosyllables, partly through gestures, to leave. I myself remained inactive and surrendered to the condition in which I found myself. Only this much I recognized for certain, that these were ideas that encroached upon me without my doing anything. Also I was aware of their unimportance and I worked to remove them in order to make space for my own and better ideas of which I was aware at the bottom of my consciousness. As much as I could imagine under the impact of those wavy and entangled images I tried to catch basic tenets of religion, conscience, and expectation of future salvation that come so readily to my mind. I recognized them to be true and firm and I said to myself with the utmost distinction and assurance: If I, the thinking substance that I am, should be placed, by some sort of death, outside the riot in my brain (which intrinsically has remained something strange to me) I would endure in the best and happiest order and would continue to think.[3] With all this there was not the slightest disturbance of sensual order [hallucination][4] I saw everything and I recognized everything in its true shape [no agnosia]; however, I could not get the better of that crowding and that stir and bustle in my head. I tried to speak, to train myself, as it were, and to test whether I could say something in a connected order; but much as I forced my attention and my thoughts and proceeded with the utmost slowness I became aware very soon of shapeless monstrous [*unfoermlich*] words that were absolutely different from those that I intended; my immortal soul was at present as little master of the inner tools of language as it had been before of my writing. I acquiesced finally in the sad expectation that if this condition became enduring I should not be able to talk or write for the rest of my life. However, the basic tenets of my mind and my philosophy would remain as they had been before and they would, to the time of my complete separation from the riotous play in my brain be a homely source [*eine einheimische Quelle*[5]] of repose and of hope for eternal salvation. I pitied my friends and relatives because in this case they would lose me for the duties of daily life and for any form of communication and I would be a burden to them. But thank God this sad grief did not last any more. After that half hour my head became clearer and quieter. Those strange annoying ideas [and images] became less lively and buzzing [*brausend*]. I was able to get through [*durchsetzen*] what I wanted to think and the interruptions by those strange ideas became weaker. I wanted to ring the bell for the servant, for he should ask my wife to come upstairs to me; however, it took me some time to repeat again and again the few words and to pronounce them correctly. And the first conversations with the members of my family were conducted slowly and anxiously

[3] We are confronted here with a rather original demonstration of the immortality of the soul and consequently the existence of God. It is the patho-psychological proof, which runs like this: in a certain patho-psychological dissociation of the mind the subject becomes aware of the existence in himself of some function of the mind which he feels is independent of the normal functioning and would continue indefinitely. The criticism of this as of any other teleological demonstration is contained in Kant's *Kritik der reinen Vernunft* (1781) where he shows the impossibility of the transition from the experience of human understanding (*Verstand*) to the speculative ideas of reason.

[4] The square brackets in the text contain explanatory remarks of this writer.

[5] In other words, a familiar source.

on my part until finally I found myself free and serene as in the beginning of the day and there was only some light headache. At this point I thought of the receipt which I had started with and had recognized as wrong. And there in letters as clear and straight as I ever have written, it read "Fifty Thaler through Consecration of Bra," with a hyphenation because the line was at an end. I was unable to think of anything in my preceding thoughts which mechanically should have brought about those ununderstandable words.[6]

Spalding goes on to point out that probably many persons with mental disorders in asylums may not be cases of insanity, that these patients may just be aphasic, as we would say today. With this idea Spalding hit upon the important problem of aphasia and intelligence defects as the sum of localized partial disorders such as aphasia, agnosia, apraxia, which was taken up later by Pierre Marie (1906) and others. (Cf. Eliasberg, *Aphasieforschung*).

As already mentioned, in that same year Moses Mendelssohn tried to provide a psychological theory in explanation of this self-introspective report. We shall start, however, with the psychological theories devoloped by Markus Herz. His case was one which we today would describe as a combination of subcortical motor aphasia with conduction aphasia. Herz states that the sensation of vision (*i.e.* in the phase of true sensation) lasts longer than the sensational phase for acoustic perceptions. Therefore, he says, the effect of vision is stronger than that of acoustic perceptions. Salomon Maimon (see footnote 1 above) did not believe in the difference of duration of the sensory qualities. In a somewhat aprioristic way he defined the sensation time as that needed by the unifying apprehension (later called apperception, especially by Wundt) through which a whole is constituted. As soon as this process is finished, the sensation as such is also finished. At that time acoustic wholes were more impressive than optic ones. In an age of stroboscopic pictures and the movies such differences between optical and acoustic successions would not have impressed psychologists any more. But in 1885, when associational psychology was still holding its own, similar ideas were developed by the Würzburg neurologist Grashey, to explain the fact that in the amnesic stage of restitution many aphasics point out the object if the name is given, but do not remember the name. Grashey's theory was the following: The duration of all sensory perceptions in the diseased brain is shortened. The optical perception is a whole; on the other hand, the sounds that compose a word form a succession. Because of the shortened aftermath the sound picture has no time to "curdle."

It was not difficult to show that this purely psychological theory was wrong and not in keeping with the clinical picture because Grashey's patient could read fluently and understood everything that was spoken; consequently his sound pictures must have lasted to enable the apperception of whole sentences.

Mendelssohn's theory of Spalding's introspection was the following: He dif-

[6] The literature of valuable introspective observations in aphasia is sparse. Cf: Naville Saloz; Monakow; "If I have worked out a thought in my brain then I am undecided whether and how I could translate the idea into language. During these vacillations I find that the sentence even before it is spoken is not as shapely as I would like it and I cudgel my brain and reject until my interlocutor is bored." Cf. also Tilney.

ferentiated ideas that have an impact on the motorium or other parts of the body, and so-called ineffective or abstract ideas. If two effector-ideas of variable degrees Z and Y are causally related, this causation will not cease if the degrees X and Y become zero. In other words here Mendelssohn anticipates unconscious relationships that are continued beneath the threshold of consciousness. He illustrates this with various examples of how normally our actions are first fully conscious and later become automatic as training increases. According to Mendelssohn non-effector ideas may be more easily combined than effector-ideas. If more than one idea is to have an impact on the same effector organ, and if this is to work smoothly, then there must be a certain succession which Mendelssohn thinks is troubled in stuttering. Among other things it is the emotions that disturb the order in which the impact of effective ideas occurs. In this context Mendelssohn mentions the narrowness of consciousness. Contrary to what people assume about the ability to write two letters simultaneously, he thinks that true simultaneity of different ideas does not exist.[7]

It is quite remarkable how an insight, which was won only through very ingenious modern experiments, was anticipated by Mendelssohn. In the analysis which follows, however, Mendelssohn's ideas become somewhat vague. He thinks that through the quick succession of unconnected activities a disturbance was produced, analogous to what we recognize as arising from an emotional state of tension. He also takes at face value Spalding's description that abstract ideas (on immortality and so forth) were entirely untroubled. He then goes off into metaphysical speculations about how the soul as a simple substance [*einfache Substanz*] may nevertheless get into abnormal states and become inhibited.

The weakness of these earlier psychological theories of aphasia may now be understood. Those early psychologists relied on too few, too casual, and too superficial observations. The ground on which they stood was not that of thorough clinical observation. Secondly, the patho-anatomical nature of the disorder, that is, localization, plays a part; no amount of psychology will explain why in one case writing, in another reading is disturbed in quite different degrees, while in other cases motor phenomena or the perception of sound are in the foreground.

BIBLIOGRAPHY

ACH, N. *Ueber die Begriffsbildung*. Bamberg, Buechner Verlag, 1921.

BONVINCINI, L. Die Stoerungen der Lautsprache bei Temporallappenlaesionen. *Handb. Neurol. Ohres*, 1929.

ELIASBERG, W. Theorien und Methoden der Aphasieforschung. *Klin. Wschr.*, 1922, *1*, no. 34.

——. Intelligenz, Intelligenzpruefung und Sprache. *Klin. Wschr.*, 1922, *3*, no. 44.

——. Die Schwierigkeit intellektueller Vorgänge ihre Psychologie, Psychopathologie und

[7] This question has been taken up in the twentieth century by the Munich School of experimental psychology. It was possible to show experimentally that simultaneity does not exist. Cf. R. Pauli, Mager, Eliasberg.

ihre Bedeutung für die Intelligenz und Demenzforschung. *Schweiz. Arch. Neurol. Psychiat.*, 1923, *12*, H. 1–2.

——. Recent work on the psychology of forming concepts. *Psychol. Bull.*, 1923, *30*, no 8.

——. Psychologie und Pathologie der Abstraktion. *Beih. Zschr. angew. Psychol.* 1925, H. 35.

——. Ueber Schwierigkeit und Ausschliesslichkeit im Seelischen. *Arch. ges. Psychol.*, 1930, *74*, H. 1–2.

GRASHEY. Ueber Aphasie und ihre Beziehungen zur Wahrnehmung. *Arch. Psychiat. Nervenkrankh.*, 1885, *16*, 654–688.

HEAD, H. *Aphasia and kindred disorders of speech.* New York, 1926.

HERZ, M. Wirkung des Denkvermoegens auf die Sprachwerkzeuge. *Mag. Erfahrungsseelenkunde*, 1789, *8*, pt. 3.

MAGER, A. Die Enge des Bewusstseins. *Münch. Stud. Psychol.*, 1920.

MAIMON, S. Wirkung des Denkvermögens auf die Sprachwerkzeuge. *Mag. Erfahrungsseelenkunde*, 1789, *8*, pt. 2.

MENDELSSOHN, M. Psychologische Betrachtungen auf Veranlassung einer von Spalding an sich selbst gemachten Erfahrung. *Mag. Erfahrungsseelenkunde*, 1783, *1*, pt. 3.

MONAKOW. Aphasia und Diaschisis. *Neurol. Zbl.*, 1906.

NAVILLE-SALOZ. Mémoires d'un médecin aphasique. *Arch Psychol., Genève*, 1918, *17*, no. 65.

PAULI, R. Ueber eine Methode zur Untersuchung und Demonstration der Enge des Bewusstseins, sowie zur Messung der Geschwindigkeit der Aufmerksamkeitswanderung. *Münch. Stud. Psychol.*, 1920, 1–36.

RIESE, W. The early history of aphasia. *Bull. Hist. Med.* 1947, *21*, 322–334.

SPALDING. Ein Brief an Sulzern über eine an sich selbst gemachte Erfahrung. *Mag. Erfahrungsseelenkunde*, 1783, *1*, pt. 2.

TILNEY, F. Discussion: remark to Foster Kennedy. *Arch. Neurol. Psychiat.*, 1936, *36*, 897.

New York City W. G. ELIASBERG

An Eighteenth Century Method of Pain Relief in Obstetrics

In 1803, Benjamin Rush, who unquestionably was the outstanding figure in American medicine at the time, wrote that in 1795 "he was led to suppose that blood-letting might be effectual in lessening the violence of the disease and pains of parturition." In his writings Rush always considered pregnancy and labor as diseases, although in his lectures he treated them under physiology. He attributed the ease with which Turkish women delivered their children to their use of sweet oil in the last months of pregnancy. Climate in the Brazils, in Calabria, in Sicily, and in several of the West Indian Islands exerts a similar influence, he said. The scanty diet of the Indian women enables them to resume their work after an unaided labor of a few hours. He noted that labor in the last stages of chronic diseases is short and comparatively easy, and both Rush and Dewees regarded pain as evidence of disease. For pain relief he advocated (i) bloodletting (30 ounces) in the beginning of labor, (ii) purgation, (iii) a low diet for ten to fourteen days before the patient is confined. In all fairness it should be said that he did not recommend bloodletting in all cases. Where there had been great previous inanition and where there were marks of languor and feeble action of the

system the remedies should be of an opposite nature, *i.e.*, supportive. He mentioned that Dr. Dewees had used bloodletting for the relief of pains of parturition when he was in practice in Abington, Pennsylvania.

William Potts Dewees (1768–1841) was the earliest great American obstetrician. His *Compendious System of Midwifery,* first published in 1824, went through twelve editions and kept abreast of the times. Thoms, in his *Chapters on American Obstetrics,* is surprised at "the small amount of real progress that has been made in obstetrical science since his time."

Dewees was graduated and received an M.B. from the University of Pennsylvania in 1789. He began practising in the village of Abington, just outside of Philadelphia, and it was there in September 1789 that he first noticed the beneficial effect of bleeding on the course of difficult labor. The patient had a history of very hard labors, many of her babies having to be delivered with the crotchet. He was very apprehensive about the outcome of the present pregnancy. To make matters worse she had a severe hemorrhage from the lungs at the onset of labor, but to everyone's astonishment the patient had a quick, easy labor. Dewees reasoned "it could be from no other cause than relaxation, produced by exercise and alarming haemorrhagy. I quickly resolved to take advantage of this kind hint, by endeavoring to imitate this good example." His subsequent experiences in Abington confirmed his reasoning and when in 1793 he returned to Philadelphia to practise and to get his M.D. degree, he chose this subject as his graduation thesis. It was dedicated to William Shippen, M.D., Professor of Anatomy; Benjamin Rush, M.D., Professor of the Institutes of Practice of Physic, etc.; Caspar Wistar, M.D., Adjunct Professor of Anatomy; James Woodhouse, M.D., Professor of Chemistry; Benjamin Smith Barton, M.D., Professor of Materia Medica; and Philip Syng Physick, M.D., Professor of Surgery in the University of Pennsylvania. The publication of this thesis gained for him so great a reputation that he became a candidate for the newly created chair of midwifery which was established at the University of Pennsylvania in 1810. In 1819 he reprinted an enlarged, 156-page edition of his thesis.

This subject was also used as a graduation thesis by Peter Miller in 1804, which would seem to be enough proof that the method had met with favor in Philadelphia or at least in the University of Pennsylvania. Fittingly enough, Peter Miller's thesis was dedicated to Philip Syng Physick, for the "Father of American Surgery" was a great believer in the relaxing effect of copious bloodletting. Miller cited the case of an irreducible dislocation of the shoulder that Physick easily and painlessly reduced after a free venesection.

What, if any, was the basis of the faith of these early Philadelphians in bloodletting as a means of relieving the pains of parturition? In the beginning of the nineteenth century Philadelphians were no longer pioneers. The women, while not subjected to the hardships of the frontier, were not exposed to the enervating

influences of running water, indoor toilets, telephones, and household electricity. Dr. John Redman, under whom Dewees "read medicine," and who was considered the most skilful obstetrician of his time, saw only complicated cases. William Shippen (1736–1808) was the first in Philadelphia to have an obstetric practice, and he had time to be the Professor of Anatomy at the University of Pennsylvania in addition. So far as is known, he was not concerned about the pains of parturition. It is more than likely the average patient took labor as a matter of course and did not consider it particularly painful.

It was only in the presence of dystocia that medical attention was invoked. When the dystocia was due to bony deformity or malposition, some destructive operation was usually resorted to. (Be it remembered the first successful Cæsarean section in the United States was in 1793.) When the dystocia was uterine, the doctor was helpless. The long, tedious cases, especially if there was a constriction ring present, were particularly painful. The patient in such instances feels severe pain but makes no progress. Dewees recognized two general classes of dystocia — that due to bony deformity and that due to faulty behavior of the soft parts. He was concerned in his essay only with the latter. He regarded pain as an evidence of "disease" and in his efforts to solve the cause of the pain he studied the various forms of uterine contractions. He concluded that contraction of the circular fibres, such as hour-glass contraction, caused no pain, but when such contraction was present, the action of the longitudinal fibres necessary to overcome this obstruction caused severe pain. He enumerated several means of relieving the diffiulty. Morphine was not without its drawbacks. Warm baths had been tried, but bloodletting was the remedy *par excellence*. He related the first case (cited above) that directed his attention to this remedy and many other cases, all quite dramatic.

In Case XXIII, Dewees actually demonstrated a constriction ring.

> 1798, Dec. 18th. I was called to Mrs. Z——, in labour with her third child; she had been in labour eight and forty hours; waters discharged, thirty-six; the uterus well dilated; pains severe, but no advancement of the labour; during the pain the child's head, which was well situated, would be forced down, but as soon as it ceased it would again be retracted; this had been the case for many hours before I saw her. In order to ascertain the cause of this delay, I introduced my hand into the uterus, and presently found the cause of the child not advancing; a circle, as it were, of the uterus had closed between the shoulders of the child and the head, which prevented their passing. I bled her to fainting; pains soon came on, and she was quickly delivered.
>
> Cases of this kind have frequently occurred to me; but in some cases I have been obliged to turn, after the bleeding, (which before was impossible) and in one or two others I have been obliged to use the forceps. These cases resemble each other so much in almost every respect, that I do not think it necessary to detail but one.

In his 1819 edition Dewees says: "We can, with a confidence that should only be produced by experience, recommend this operation, not only as a safe, but a certain remedy for all the objects we have just contemplated: and feel the more

security in doing this, since it met the approbation of the late venerable and experienced professor of anatomy and midwifery, Dr. Shippen; who declared with a candour which did him honour, he could have spared much pain and misery to many of his patients had he used the lancet more freely in tedious and painful cases from rigidity."

In conclusion, he says he had never seen puerperal fever, milk abscess, or the swelled leg, take place in any patient who had suffered large or repeated bleedings during their labor; "it seems to ward off every blow aimed at the puerperal state."

There remains the problem of explaining why the remedy that was so extensively used and which evidently had merit disappeared so completely from the obstetrician's armamentarium. Venesection was the prime remedy for inflammation both in medicine and surgery. Benjamin Rush used it routinely in the great yellow fever epidemic, and maintained that he cured patients who would have died otherwise. Others were just as strongly of the opinion that he had done harm. The discussion grew acrimonious and ended in a famous lawsuit which settled nothing except that Cobbett, Rush's opponent, and editor of *Rush Light,* had to leave the State. The next generation, under the leadership of Louis and his statistical method, settled such controversies in a more scientific method. The verdict in regard to venesection was adverse. The reaction against bloodletting was so intense that the procedure disappeared completely even in such fields as congestive heart failure and eclampsia, where there was no doubt as to its efficiency. It was almost a hundred years before venesection began to be used again. Now it is used in some cases of congestive heart failure and certain cases of eclampsia. Substitution transfusions for erythroblastosis might be considered a modern adaptation of the oldfashioned bloodletting. Quite recently bloodletting for surgical hemostasis has been advocated by Donald Hale. Before the profession had recovered from the marked and universal reaction against venesection, anesthesia had been discovered and obstetricians became engrossed in ether controversies, chloroform controversies, twilight sleep, etc.

Summary

A method of pain relief, when the pain was due to irregular or spasmodic uterine contraction, was extensively used in Philadelphia at the end of the eighteenth and the beginning of the nineteenth century. It was advocated by two of the outstanding physicians of the country and served as a graduation thesis in at least two instances. An explanation as to why an apparently worthwhile method of treatment was abandoned is suggested.

It is interesting that Dewees in the beginning of the nineteenth century and Grantly Dick Read in our own times should have emphasized the importance of relaxation in comfortable childbirth and it is also interesting that Dewees should have chosen the quicker and more certain means of causing relaxation.

REFERENCES

Rush, B. *Medical Repository*, 1803, *6*, 26.
Dewees, W. P. *The means of lessening pain and facilitating certain cases of difficult parturition*. Philadelphia, 1806, p. 95.
Dewees, W. P. *Ibid.*, Philadelphia, 1819. p. 156.
Miller, Peter. An essay on the means of lessening pains of parturition. Philadelphia, 1804.

Richmond, Virginia M. Pierce Rucker

German Society for the History of Medicine, Science and Technology

Early in September 1949 there came an announcement of the formation of Die Deutsche Vereinigung für Geschichte der Medizin, Naturwissenschaft und Technik on November 9, 1948 at Frankfurt am Main. The organization is temporarily headed by Dr. Paul Diepgen (Mainz) and Dr. Johannes Steudel (Bonn). The first meeting of the Society was held on September 25 and 26, 1949 at Frankfurt a.M. with the following program:

Sunday

Prof. Dr. Lorey, Frankfurt a.M.: Bemerkungen über das Studium der Geschichte von Mathematik und Naturwissenschaften.
Prof. Dr. Heischkel-Artelt, Mainz: Romantische Pharmakologie.
Kustos P. A. Kirchvogel, Kassel: Wege und Ziele der Technographie.
Dr. E. Stübler, Tübingen: Tübingen und das medizinische Zeitschriftenwesen.
Oberärztin Dr. K. Heinemann, Kassel: Die Ärzteheiligen Kosmas und Damian.
Dr. A. v. Engelhardt, Marburg: Emil von Behring und die Geschichte der Medizin.
Prof. Dr. J. Steudel, Bonn: Zwei unbekannte Paracelsus-Zitate Goethes.
Dr. G. Rath, Bonn: Elf unveröffentlichte Briefe Konrad Gesners.
Prof. Dr. Diepgen, Mainz: Augustin in der Geschichte der Anatomie.

Monday

Prof. Dr. W. Artelt, Frankfurt a.M.: Das Titelbild von Vesals "Fabrica" und die Geschichte des Anatomiebildes.
Prof. Dr. W. Lorey, Frankfurt a.M.: Johann Hartmann Beyer, Frankfurter Stadtarzt, Bürgermeister und Mathematiker, 1563–1625.
Prof. Dr. Rothschuh, Münster: Josef Görres und die romantische Physiologie.

Brazilian Institute of the History of Medicine

The Brazilian Institute of the History of Medicine met on August 31, 1949 at the Salão Nobre da Policlìnica Geral do Rio de Janeiro. The program consisted of two parts. The first part commemorated the Goethe Bi-centenary, with a lecture by Dr. Jayme de Mendonça Castro on "Goethe, Poet and Naturalist." In the second part, Dr. Ivolino de Vasconcellos spoke on "Two Peruvian Masters of

Medical History: Carlos Enrique Paz Soldan and Juan B. Lastres," and Dr. J. Coriolano de Carvalho on "Ezequiel Corrêa dos Santos."

Medical History in Foreign Publications

CUBA

Miguel A. González Prendes and Ramón Ibarra Perez: Origen e introducción de la lepra en la Isla de Cuba. (Origin and introduction of leprosy in Cuba.) *Memoria del V Congreso Internacional de la Lepra,* Habana, Cuba, 1949, pp. 623–633.

GERMANY

Erich Hoffmann: Fritz Schaudinn. *Ärztliche Forschung,* 1947, *1,* 314–316.

W. Kirfel: Gehen die medizinischen Systeme Altindiens und des Mittelmeerraumes auf einen gemeinsamen Ursprung zurück? (Do the medical systems of Ancient India and the Mediterranean area derive from a common source?) *Grenzgebiete der Medizin,* 1948, *1,* 6–10.

R. F. G. Müller: Der "Kaiserschnitt" nach indischen Überlieferungen. (Cæsarean section according to Indian traditions.) *Grenzgebiete der Medizin,* 1948, *1,* 60–62.

C. Strehl: Die Entwicklung des deutschen Blindenwesens. (The development of aid for the blind in Germany.) *Grenzgebiete der Medizin,* 1948, *1,* 50–56.

ITALY

P. Diepgen: Die Lehre von der leibseelischen Konstitution und die spezielle Anatomie und Physiologie der Frau im Mittelalter. (Woman's psycho-physical constitution and her special anatomy and physiology as seen in the Middle Ages.) *Scientia,* 1949, *43,* 97–103, 132–134.

Giuseppe Sangiorgi: *Infravirosi umane ed animali nei contributi Italiani.* (Italian contributions to the study of human and animal viruses.) [Collana di Monografie di "Igiene e Sanità Pubblica" n. 2]. Salerno, 1948. 67 pp.

A. Baffoni: Considerazioni sulla vita di una malattia da microbi: la polmonite. (Remarks on the life of a microbial disease: pneumonia.) *Archivio di Tisiologia,* 1949, *4,* 85–87.

G. Pezzi: Una rara opera di terapia spagirica des sec. XVII ad uso dei naviganti. (A rare seventeenth century work on spagyric therapy for the use of seamen.) *Annali di Medicina Navale e Coloniale,* 1948, *53,* 333–353.

NORWAY

Reidar Melsom: The guiding principles of the campaign against leprosy in Norway during the last hundred years. *Memoria del V Congreso Internacional de la Lepra,* Habana, Cuba, 1949, pp. 693–702.

SOVIET UNION

Ph. R. Borodylin: V. G. Belinskii i Russkaya Meditsina. (V. G. Belinsky and Russian medicine.) *Sovetskoye Zdravookhraneniye,* July–August, 1948, no. 4, pp. 39–43. (In Russian.)

VIET NAM

Phan Huy Dan. *Quelques suggestions sur la reorganisation sanitaire au Vietnam.* Paris, Imprimerie R. Foulon, 1949.

YUGOSLAVIA

R. Jeremić: Prilozhak istoria zdravstvena kultura i Boka Kotorska. (Contributions to the history of hygiene at Boka Kotorska.) *Serbian Archives of Medicine,* 1949, *47,* 376–379. (In Serbian.)

R. Jeremić: Zdravstvena pravila i Srba i XVII i XVIII veki. (Health rules among the Serbs in the 17th and 18th centuries.) *Serbian Archives of Medicine,* 1949, *47,* 471–483. (In Serbian.)

Dr. Max H. Fisch joins Advisory Board of Life of Science Library

Dr. Max H. Fisch, Professor of Philosophy at the University of Illinois, has just been named as a member of The Life of Science Library Advisory Board. The Library, a carefully planned series of books, was organized in 1946 by Henry Schuman to acquaint the general reader with the derivations of scientific ideas in relation to the broad history of human culture. In becoming a member of the Advisory Board, Dr. Fisch joins other distinguished educators and scientists now providing editorial counsel for the series.

Dr. John F. Fulton appointed Rosenbach Fellow in Bibliography

Dr. John F. Fulton, Sterling Professor of Physiology at Yale University, has been appointed Rosenbach Fellow in Bibliography for the year 1949–1950 at the University of Pennsylvania.

Dr. Fulton will deliver a series of three lectures entitled "The Great Medical Bibliographers: a Study in Humanism" on February 2, 9, and 16, 1950.

Scottish Society of the History of Medicine

The sixth meeting, and the first annual meeting, of the Society was held in the Council Room of the University of Edinburgh on October 14, 1949 when there was a discussion on "The Teaching of the History of Medicine." The subject was

introduced by the President, Dr. Douglas Guthrie, followed by Dr. W. D. D. Small, President of the Royal College of Physicians, and by Mr. Denys Hay, Director of Studies, Faculty of Arts. Many members took part in the discussion, and an excellent synopsis of the views expressed was given by the Honorary Secretary, Dr. H. P. Tait.

Wellcome Medal and Prize in the History of Medicine at the University of Edinburgh

The Wellcome Medal and Prize (£25) will be awarded in July 1950 for the best essay on "The Early History of Pædiatrics in Britain."

Competitors must have been members of the University Class of the History of Medicine within a period of five years preceding the date of award. Essays are to be in the hands of the Dean of the Faculty of Medicine on or before May 1, 1950.

SYDNEY SMITH
Dean of the Faculty of Medicine

Book Reviews

FREDERICK EBERSON. *Microbes Militant: a Challenge to Man: The Story of Modern Preventive Medicine and Control of Infectious Diseases.* New York, Ronald Press, 1948. x + 401 pp., 25 illus. $4.50.

THIS volume is a revision of Dr. Eberson's book published in 1941 under the title *The Microbe's Challenge*. It forms one of the volumes of the "Humanizing Science Series" edited by Jaques Cattell. The volume is a well-organized and well-written account of the development of preventive medicine and the control of infectious diseases. It can be read with profit not only by the intelligent layman, but also by medical students and public health workers desiring to orient themselves satisfactorily in understanding the background of our current knowledge of public health methods of control of infectious diseases.

Dr. Eberson himself has participated broadly in research and practice in the field in which he writes. While he writes imaginatively, he has been too successful a teacher to yield to the temptation of exaggeration. The theme of the volume emphasizes the amazing adaptability of microbes to meet changing conditions. This constitutes their challenge.

The organization of Dr. Eberson's book may seem puzzling at first to the professional microbiologist, or to the historian of science. Each chapter, however, deals with some phase of the adaptability of micro-organisms to changing environmental conditions. Thus there is unity through the dominant theme.

Dr. Eberson gives reasonable credit to significant recent advances in microbiology. His book is by no means a mere history of bacteriology. It includes discussions of parasitism, antibiotics, viruses, and epidemics. The discussion is essentially technical, but placed in an historical setting.

There is a glossary, a brief bibliography, and an index. A few minor errors, such as noting John Hunter as a contemporary of Huxley, are correctable in future editions.

University of Texas CHAUNCEY D. LEAKE

LEMUEL SHATTUCK and Others. *Report of the Sanitary Commission of Massachusetts, 1850,* with a foreword by Charles-Edward Amory Winslow. Cambridge, Mass., Harvard University Press, 1948. ix pp., facsim., 321 pp. $4.50.

THIS book is a facsimile edition of the famous "Survey of Massachusetts" which was published in 1850 by the Massachusetts State Legislature. The Survey was made and the Report written by Lemuel Shattuck, a book-seller of Boston, and it is now generally regarded as the foundation stone of public health administration in the United States.

Mr. Shattuck made fifty recommendations to the State of Massachusetts which might very well be taken as a satisfactory program for health administration in a community at the present time. He recommended the establishment of state health boards and suggested full-time state health officers for each state. He recommended the teaching of preventive medicine in all our medical colleges and also recommended incorporation by physicians of preventive services in clinical practice.

Mr. Shattuck's vision and constructive imagination was so far in advance of his time that it required nineteen years before the first state health department was organized, and he did not live to see a single one of his recommendations carried into effect. The report was buried in the archives of the State House of Massachusetts and has now been republished so that it is available to all students of public health. It should be on the shelf of every health officer in the nation.

There is a fine foreword by Dr. C.-E. A. Winslow. The general appearance of the book is most attractive. It was not possible to publish the original Report in its entirety and only the first 321 pages of the original volume are issued.

The appendix of the original Report (unpublished in this facsimile) gives the Sanitary Acts of Massachusetts from its early establishment, and also the Health Ordinances of Boston. It includes the Sanitary Surveys of Franklin County, Boston, Lawrence, and Attleboro; also Reports of the Boards of Health of Plympton and of Lynn. Mr. Shattuck also included in the appendix a list of suggested books that he recommended for the forming of "Sanitary Libraries" in local health departments, and suggested that small appropriations should be made each year for the purchase of publications for state and local departments of health. This last recommendation is one of the most pertinent recommendations of the entire Report. The complete Report contains 544 pages, and it has an excellent index.

School of Medicine, Cornell University W. G. SMILLIE

DAVID MASTERS. *Miracle Drug, the Inner History of Penicillin.* London, Eyre & Spottiswoode, 1946. 191 pp. illus. 10s.6d.

MARGARET GOLDSMITH. *The Road to Penicillin, a History of Chemotherapy.* London, Lindsay Drummond, 1946. 174 pp. illus. 10s.6d.

MR. MASTERS is a professional science writer. His craftsmanship is excellent and he has told the now familiar story of penicillin very well indeed.

Every schoolboy knows by now (or does he?) that penicillin is a substance produced by certain varieties of a common mold, *Penicillium notatum,* which has the extraordinary property of killing the germs of some of the most terrible diseases known to man. Because this substance, penicillin, is effective in cases where other well-known drugs have failed, it quickly caught popular imagination and was termed a "miracle drug."

The story of penicillin has been told several times, mostly by American writers. Mr. Masters tells it from the British point of view. Having read most of the accounts I must confess that in my judgment Mr. Masters has done about the best job so far. He attempts to be fair to all concerned and in this he leans over backward to give the American contributors their just credit. He devotes a whole chapter to the work of Dr. Roger Reid, who at the Pennsylvania State College was probably the first American to attempt to repeat Fleming's original work. Other writers have either ignored Reid's pioneer work or have dismissed it in a line or two.

The complete story of penicillin has yet to be written. Until that event occurs Mr. Masters' book will be a useful and informative stopgap.

Miss Margaret Goldsmith's book is a story on a more ambitious scale since she attempts to tell in simple terms the history of chemotherapy, retracing therein the steps which led to the discovery of penicillin.

In a very brief space the author takes up man's earliest gropings toward an understanding of infectious diseases and their control. She mentions Hippocrates, Galen, Fracastoro, Leeuwenhoek, Paracelsus, and other early students. The main part of the book is devoted to an account of the development of bacteriology and chemotherapy through the labors of Pasteur, Lister, Koch, and Ehrlich, the father of modern chemotherapy. In the last chapter she takes up the story of penicillin, an account which suffers by its brevity in comparison with the detailed work by Masters. There are many illustrations and an author index.

Physicians themselves could profit from reading either or both books and they could well recommend these books to patients who ask for information about the new drugs with which they are being treated.

Washington, D. C. MORRIS C. LEIKIND

History of the Medical Society of the District of Columbia. Part II, 1833–1944. Compiled by John B. Nichols, William J. Mallory, and Joseph S. Wall. Baltimore, Waverly Press, 1947. vii + 357 pp., 14 illus. $5.00.

THE present volume is a continuation and amplification of the *History of the Medical Society of the District of Columbia,* 1817–1909, published by the Society in 1909, which has been known as "Lamb's *History,*" since it was consummated by Dr. Daniel S. Lamb. In 1942 a committee was appointed to prepare a history which would supplement the earlier publication and bring it down to date. So far as the Medical Society is concerned, Part II begins with the year 1909, but it goes back to 1833 in order to include the hitherto unpublished history of the Medical Association of the District of Columbia. The two organizations amalgamated in 1911 after long periods for each of separate existence although largely overlapping in membership. The Society, organized in 1817, was granted charters by Congress in 1819 and 1838 which limited its functions and powers to promotion and dissemination of knowledge in medicine and surgery and to licensing

medical practitioners in the District of Columbia. The need of some organization which would have disciplinary power over its members and could exercise economic and ethical functions for the profession led to the formation of the Medical Association of the District of Columbia in 1833. By their merger in 1911 the powers of the two were brought together within one organization.

Although the amalgamated societies continued under the name "Medical Society of the District of Columbia," the fusion was on equal terms, the reorganized body deriving as much from one as from the other of the old societies. It therefore has a long background of tradition, spirit, and achievement. On the date of amalgamation, July 10, 1911, the reorganized body started with 559 members, 421 from the former Society and 138 from the Association who were not members of the Society.

The record from that date on is divided into the periods 1911–1917; the period of the World War I (1917–1919), including the Society's participation in the fight against the great influenza epidemic; an account of the Society's building activities; and the quarter-century, 1920–1944, in which is told the story of establishment of lectures, scientific assemblies, revision of its constitution, participation in World War II, and other activities. Chapters on economic problems, including the suit against the Society, the American Medical Association and related groups in 1938, on membership, periodicals and other publications, and on collateral agencies, complete the text. One hundred seventy-nine pages, nearly one-half of the volume, are devoted to lists of members.

The entire book represents a well-written and broad survey of the activities of an alert professional organization from the turbulent days of its youth in a young country to the dignified Medical Society in the capital of a powerful nation. As a chronicle of the growth and functioning of a professional organization the book is a contribution to the history of medicine. One could wish that it gave more insight into the background of the problems faced from time to time.

The volume is well printed, attractively bound, and is illustrated by photographs of a number of the leaders in the Society's history and other reproductions.

Portland, Oregon O. LARSELL

DOUGLAS FIRTH. *The Case of Augustus d'Esté.* Cambridge, At the University Press, 1948. vii + 58 pp., frontispiece-portrait, 2 facsimiles of the manuscripts, and genealogical table. $1.75.

WE are used to regarding original descriptions of disease as landmarks of medical history. Such descriptions, though often hidden away in the mass of now obsolete scientific literature, were epoch-making and they are of enduring and of more than mere historic value. It is of interest, therefore, that here such a description has come to light, not based on scientific experiment and investigation, but writ-

ten by a layman who, with vivid observation and considerable accuracy, has recorded the progress of his own complaint—disseminated sclerosis. At the time these notes were taken (1830–1846), this chronic nervous disorder was still an unknown and undescribed disease. Sir Robert Carwell, in his *Pathological Anatomy,* and Jean Cruveilhier, in his *Anatomie pathologique,* simultaneously gave illustrations of the condition around 1836, but the first important and comprehensive account of it was given by Friedrich Theodor Frerichs in 1849 (*Arch. f.d. ges. Med., 10,* 334–50). The fact that the subject of this report was one of the "romantic" figures of early nineteenth century England and that the manuscripts on which this book is based were discovered during the drive for waste paper in time of war add color to this publication. Augustus Frederick d'Esté (1794–1848) was the grandson of George III, the morganatic son of Prince Augustus Frederick, and a cousin of Queen Victoria. His mother was Lady Augusta Murray, daughter of the Earl of Dunmore (Lady d'Ameland), whose clandestine marriage to the Prince was annulled under the provisions of the Royal Marriages Act. The first part of this book, based on rediscovered private papers of mother and son, gives some details of this personal history, an outline of d'Esté's infancy and adolescence, and of his and his mother's life-long struggle for recognition as members of the royal family. They are recorded as representing some of the etiological factors in d'Esté's disease. Part II reproduces in full a manuscript entitled "The Case of Augustus d'Esté" which is now in the possession of the Royal College of Physicians, London. It contains a complete clinical picture of his disease which, at his time, was considered something of a curiosity. He names the physicians whom he consulted, among them such celebrities as Sir Astley Paston Cooper, Sir Benjamin Collins Brodie, and Richard Bright, the prescriptions they gave him, the fees they charged, and the bath waters he tried. Thus the small, carefully edited volume, which should be of special interest to the neurologist, also gives an insight into the state of medical practice at that time.

New York MARTHA ALEXANDER

LEWIS MANSFIELD KNAPP. *Tobias Smollett: Doctor of Men and Manners.* Princeton, Princeton University Press, 1949. xiii + 362 pp., illustrated. $5.00.

PROFESSOR KNAPP has attempted, in this modern biography of Tobias Smollett, as he puts it in his own words, to "rectify factual and interpretive inaccuracies in former accounts of Smollett," to be "accurate in presenting whatever new material is brought to light," and to make "every effort to project a living personality vitalized by facts rather than by specious fictions." Devotees of the history of medicine will be particularly interested to learn of the degree of success which Professor Knapp's venture has met, both because of Smollett's position as a member of the medical profession and because of his intimacies with some of the more colorful of his medical contemporaries.

It is a custom, perhaps unfortunately prejudiced, of the present reviewer to calibrate the accuracy of commentaries on eighteenth century London according to the commentator's designations of the Hunters, particularly John. The current volume, in the text, twice erroneously calls John Doctor, although it correctly labels him Mr. John Hunter, Surgeon, in the legend of a delightful contemporary drawing of Smollett with the two Hunters. Its record is therefore in this respect estimated at about 66⅔ per cent in accuracy if not in consistency. The reviewer, who has made her own errors concerning Smollett, appreciates well the difficulty of attaining perfection in the matter of such technical details. But high standards must be set on work motivated by a desire to meet "the challenge of building a definitive biography commensurate with Smollett's stature as a man and as a writer."

So far as Professor Knapp's second goal is concerned, namely, his attempt to rehabilitate, as he states it, Smollett's personality, here too he falls somewhat short of complete success. Here, however, his shortcoming is less a result of his own fallibility than of the general limitations which seem to beset biographers of even the most vivid personalities. The failure of many of the most capable biographers to bring their characters alive is a great puzzle, the more so because in some cases even mediocre fiction succeeds in doing so, a situation arising possibly from the fact that incomplete factual knowledge must hamper the biographer where the frank inventor can contrive his own situation, possibly because so frequently the biographer is primarily a scholar in the narrow sense of the word rather than a creative artist.

Professor Knapp, however, is probably hardly to be chided for having given a less ebullient characterization of Smollett than the latter has given himself in the more autobiographical portions of his writings, since Smollett was not only a particularly dynamic individual, but also had the gift of particular aliveness and originality in describing such qualities in his writing. This was his most special contribution, and as such the characteristic which makes him of greatest interest. In the absence of it in the present author, the new biography remains, like so many others, a volume which one would recommend to readers who wish to know sources for facts rather than those who wish to find any exceptional recreation imagined around them. Smollett's own writings still remain the clearest mirror of his image.

Bryn Mawr College JANE OPPENHEIMER

KARL F. W. JESSEN. *Botanik der Gegenwart und Vorzeit in culturhistorischer Entwickelung. Ein Beitrag zur Geschichte der abendländischen Völker, 1864.* [Pallas I] Republished by The Chronica Botanica Co., Waltham, Mass.; New York, Stechert-Hafner, Inc., 1948. xxii + 495 pp. $6.00.

DONALD WYMAN. *The Arboretums and Botanical Gardens of North America* [Chronica Botanica, Volume 10, Number 5/6, pages 395–498], Waltham, Mass.; The Chronica Botanica Co.; New York, Stechert-Hafner, Inc., 1947. $1.50.

Among the histories of botany, Karl Jessen's *Botanik der Gegenwart und Vorzeit in Culturhistorischer Entwickelung* occupies a unique place. It owes this position to the author's approach to his subject, namely, to his view that the history of science (in this particular case, botany) is a part of the history of human culture.

Karl Friedrich Wilhelm Jessen was born in Schleswig in 1821. In 1848, he received his Ph.D. degree at Kiel, and some time later became *Privat-dozent* at Berlin. From 1851 to 1877 Jessen was professor at the Agricultural College of Eldena, in Pomerania. He died in Berlin in 1889. Among other literary works, Jessen completed and edited E. Meyer's *Alberti Magni de Vegetabilibus Libri VII* (1867). His historical interests had been stimulated by Gervinus, one of the "Göttingen Seven."

Jessen's history traces botanical knowledge in its cultural relations from antiquity to his own day. He tries to show how the development of botany is connected with social and economic conditions, the general state of science, and the philosophies of different periods. For this reason, students of medical history will find much of interest to them in this work.

We owe the republication of this book to Frans Verdoorn who with it initiates a new series called *Pallas,* which is to be a collection of offset reprints of out-of-print and classic scientific works. The first volume of *Pallas* is indeed a most auspicious beginning.

Another publication of some historical interest, issued by the Chronica Botanica Co., is Wyman's *Arboretums and Botanical Gardens of North America.* Of particular interest in this volume are the numerous illustrations of botanical gardens, many of them after rare, old prints. Among them are Linnæus' famous Trädgård, the *Hortus botanicus* of Uppsala, Bartram's garden at Philadelphia, the garden at the University of Leyden, and the Apothecaries Garden at Chelsea, London. In addition, readers will be interested not only in Wyman's account of the arboretums of North America, but also in his general bibliography on botanical gardens and in his detailed notes on how to establish an arboretum.

GEORGE ROSEN

JAMES BARCLAY. *Why No Nurses?* London, Faber and Faber, Ltd., 1946. 176 pp. 6 shillings.

THE problem of finding enough girls willing to undertake the care of the sick and to fill the need for nurses in the public health ranks is now more acute than it has ever been. Such a shortage is not merely a situation which makes it difficult for a number of health agencies to give full service; it is rather a threat to national

health and social advance. Barclay's small book is evidence that this problem is as acute in Great Britain as it is in the United States.

As historians we are aware that no problem can be adequately stated or studied without knowledge of the past development of the subject. Its history often points up the cause of a problem and at the same time offers a solution. A review of the history of nursing shows that in considerable degree the present crisis in recruitment stems from nursing's past.

The author presents such an analysis with particular reference to Great Britain, and points out the differences between the "modern girl" of 1845 and her counterpart of 1945. The profession of nursing is carefully analyzed, without recourse to sentimentality or hokum, and a number of recommendations made which would tend to give nurses a more respected social status and greater scope to develop their personalities.

GEORGE ROSEN

F. W. Robins. *The Story of Water Supply*. London, New York, Toronto, Oxford University Press, 1946. x + 207 pp. illus. $5.50.

THIS book is an interesting contribution to a subject on which the literature is scanty. In view of the importance of water for life, it is not surprising that man from the earliest times should have settled where an ample water supply was available. As the need for water increased with the growth of cities, supplies were sought at a considerable distance; in witness of this quest we have the Roman aqueducts.

In this erudite volume, which shows evidence of wide travel and reading, and which was written for "the uninformed but interested layman," Mr. Robins traces the history of water supply from antiquity to the present. The author treats his subject as a phase of social history, and without excessive technical detail. Throughout one finds numerous items of considerable interest. For instance, the inhabitants of Imperial Rome had a supply of forty gallons per head per day, a standard which has been attained again only recently. To a generation accustomed to a plentiful supply of water on turning a faucet, it will be of interest that from the sixteenth through the eighteenth centuries, conduits through which water was supplied were turned off at night. Again, in 1800, the Plymouth Dock Water Company offered its customers water for two hours only every other day.

Mr. Robins devotes considerable attention to Great Britain, and there are numerous references to the United States. This is a book worth reading, not alone for the intrinsic interest of the subject, but because it provides an introduction to a phase of public health which is not infrequently given short shrift by historians.

GEORGE ROSEN

ANTHONY FIDLER. *Whither Medicine: from Dogma to Science?* London and New York, Thomas Nelson and Sons, Ltd., 1946. xi + 155 pp. 6 shillings.

THIS book would be of small interest to readers of the *Journal* were it not for the fact that it is a striking example of the baneful effects of historical ignorance. The author sets out with the laudable aim of providing a philosophical underpinning for medicine, and ends up with what he terms the medicine of probability. This turns out to be nothing more nor less than the application of statistical method to the evaluation of clinical practices. Shades of Pierre Louis! Had the author looked into the history of medicine, he would soon have learned that the use of statistics in medicine has been advocated and applied for over a century, and that in the United States statistical evaluation of clinical results is a commonplace in medical and public health literature.

GEORGE ROSEN

NOTES ON CONTRIBUTORS

FENWICK BEEKMAN, M.D., is Chief of Surgical Service, Hospital for Special Surgery; Consulting surgeon, Bellevue Hospital; President of the New-York Historical Society. He has long been interested in the Hunters.

WLADIMER G. ELIASBERG, M.D., Ph.D., is a Fellow of the American Psychiatric Association. His address is: 420 West End Avenue, New York 24, N.Y.

JAMES H. FERGUSON, M.D., is Instructor in the Department of Obstetrics and Gynecology at the School of Medicine, Tulane University, and Obstetric Consultant of the Mississippi State Board of Health.

EBBE C. HOFF, M.D., is Associate Professor in charge of the section of Neurological Science, Medical College of Virginia, Richmond.

JULES CALVIN LADENHEIM, M.D. (New York Medical College), had his interneship at Queens General Hospital and is Associate Surgical Resident at Flower-Fifth Avenue Hospitals under Professor James Winfield.

MAX NEUBURGER, M.D., Ph.D., formerly Professor of the History of Medicine in Vienna, celebrated his eightieth birthday in this country where he now resides with his son at 20 Toledo Street, Buffalo 17, N.Y.

F. N. L. POYNTER, B.A. Hons. (London), F.L.A., Deputy Librarian of the Wellcome Historical Medical Library, London, has been on its staff for the past twenty years except for service in the Royal Air Force (1941–6). He has edited, with an introduction, *Selected Writings of William Clowes, 1544–1604* (1948); (with W. J. Bishop) *A Seventeenth Century Country Doctor and his Patients: John Symcotts* (in press); compiled the *Catologue of Incunabula in the Wellcome Library* (in press); and is now engaged in writing a full-length biography of Thomas Southwood Smith (1788–1861).

WALTHER RIESE, M.D., is Assistant Professor of Neuro-Psychiatry and Assistant Professor of the History of Medicine at the Medical College of Virginia. He was formerly Chargé de Recherches du Centre National de la Recherche Scientifique (Paris) and Privatdozent of Neurology at the University of Frankfurt a. M.

M. PIERCE RUCKER, M.D., President of the Medical Society of Virginia and Editor of the *Virginia Medical Monthly*, limits his practice to obstetrics and gynecology. He is particularly interested in the history of obstetrics.

Printed in the United States of America
By The Hildreth Press, Inc.
Bristol, Connecticut

On the Passage of Yolk into the Intestines of the Chick

(De vitelli in intestina pulli transitu)

NICOLAUS STENO

Translated with an Introduction and Commentary

MARGARET TALLMADGE MAY*

Introduction

THERE are several reasons why Nicolaus Steno's letter reporting his discovery of the vitelline duct[1] in a newly hatched chick is of sufficient interest to deserve translation. Chief among these, perhaps, is the fact that this letter represents the last chapter of a story which began in Aristotle's day. For although the vitelline duct was known to Aristotle, the knowledge of it was thereafter lost not only once, but a second time, after its rediscovery by Volcher Coiter. If one could be sure that the account in Albertus Magnus' *De animalibus* was based on observation and was not a mere parroting of Aristotle, there would then be even a third ascent to the light, followed by another relapse into oblivion. In any case, it was not until Steno observed the duct in 1664 with all the astonishment and joy of a new discovery and described it clearly and in detail that it took its proper place in the body of knowledge common to all subsequent anatomists.

This treatise, moreover, slight though it is, still contrives to reflect many of the trends of its day, and its day was the high tide of the seventeenth century when the scientific Renaissance had crossed the Alps, when Amsterdam and Copenhagen were brimming over with the creative spirit, when a brilliant group in London was laying the foundations of the Royal Society, and when men were learning more and more to face not back to the past, but forward, and to say *hoc vidi* rather than *ipse dixit*. It is all here in the *De vitelli . . . transitu;* here is the sense of abundant life and fresh achievement; here, too, are the echoes of lusty quarrels, inevitable accompaniments of a period of such vigorous activity, the differing, though ever so respectfully, from ancient authority, the searching out of new methods and theories and, above all, the urge to see, touch, handle, and interpret.

* Ithaca, New York.

[1] The vitelline duct is the patent canal connecting the yolk with the intestines of the developing chick.

Finally, Nicolaus Steno, or Niels Stensen to give him his Danish name, was one of the foremost scientists of his time, a man steeped in the lore of the ancients—not for nothing was he known as "the learned Dane"—whose keen mind was, however, remarkably independent, and whose uncanny ability to observe what escaped others was linked with quick insight to perceive the implications of his discoveries and to draw correct conclusions from them. Though his finding of the vitelline duct was by no means one of his major attainments, his report of it is still fairly typical of the behavior of his mind and is thus worthy of a thoughtful reading, not only by the biologist, but by all who would enjoy companionship with a first-rate intelligence.

The sources of our knowledge of Steno's life are numerous and adequate. His own scientific and theological writings contain much personal information, and whatever more is needed to complete the story is readily gleaned from his correspondence and that of his friends and contemporaries. The facts of the brief sketch presented here are taken necessarily from secondary sources for the most part, but, in gathering them, I have become convinced that it would be a rewarding task for someone having access to the original material to give us a full-scale biography of Steno in English. (For several fine accounts of his life in other languages, see my list of references.)

He was born in Copenhagen sometime in January, 1638; the precise date is given variously as New Year's Day, January tenth, and twentieth.[2] His father, who was a well-to-do goldsmith enjoying the patronage of the Danish King, Christian IV, died when Steno was only six years old, and his mother later married Johann Stickman, another goldsmith. Niels was a delicate lad who, perhaps because of his ill health, cared nothing for the boisterous sports of companions of his own age and much preferred to sit quietly listening to the conversation of his elders, especially if religion happened to be the subject of discussion. At the age of eighteen he became a student at the University of Copenhagen where he began his scientific studies, paying particular attention to medicine. While there he came under the influence of several excellent teachers, chief among them the famous Thomas Bartholin with whom Steno was on intimate terms from that time forth. In 1660 he went to continue his studies in the Netherlands, first at Amsterdam, and there, thanks to the letters of recommendation he bore with him from Bartholin, he was received into the home of Gerard Blaes, a noted professor, where he made his first anatomical discovery—the parotid

[2] See Jorgensen, pp. 2 and 216.

duct, which now bears his name. From this discovery there stemmed an academic quarrel lasting three years, for Blaes claimed priority, and Steno defended himself with spirit. Naturally enough, he left Amsterdam after a stay of only four months and went to Leyden where he profited greatly from the inspiring guidance of Sylvius and Van Horne, and where a great deal of his outstanding work in anatomy was accomplished. Here he was one of a group of gifted students, his intimate friends and admirers, and here also he was again involved in disputes over the interpretation of his work on the glands. These years in the Netherlands were noteworthy, too, for the development of his childhood interest in religion, for here the earnest, strict, young Lutheran first encountered religious freedom and was exposed to the influence of creeds other than his own.

In November, 1663, Steno's stepfather died, and Steno was called home. This stay in Copenhagen must have been a painful time for him, for within a few months he also lost his mother and, besides, suffered a severe check in his career. He had come home full of hope that the laurels he had won in Holland would bring him a professorship at the University of Copenhagen, but Bartholin, who had always had a high regard for Steno's abilities, and in whose gift the position seems to have lain, was in this instance guilty of flagrant nepotism, and the appointment went to Bartholin's nephew, Matthias Jacobaeus. With his home broken up and his hopes of preferment unfulfilled, there was nothing further to keep Steno in Copenhagen, and the autumn of 1664, accordingly, found him starting again on his travels.

This time he journeyed to Paris by way of Amsterdam and Cologne, his pause in Cologne being memorable for a discussion of religion with a Jesuit, which deepened his already lively interest. In Paris he once more became one of a brilliant scientific circle, the Maecenas of which was Thévenot who took Steno into his own home, introduced him to his friends, and helped him in his work; it was at Thévenot's house that he delivered to a select group of scientists that lecture on the anatomy of the brain which Daremberg does not hesitate to call the real starting point of modern investigation in this subject.[3] That he was an immediate success, and also that Copenhagen had lost both a gifted scholar and an inspired teacher, is indicated by the following notice which appeared in the *Journal des scavans* for March, 1665, and which gave him his sobriquet:

> This learned Dane is living in Paris for the present, where every day he performs dissections in the presence of many eager students. This he has also done in the École de Médecine and has excited the admiration of all the world with his new discoveries. For he has the gift of presenting most of his discoveries so clearly that one is compelled

[3] Daremberg, II, 673. Cited from Plenkers, *Der Däne Niels Stensen*, p. 27.

to agree with him and to wonder how they could have escaped all his predecessors in anatomy.[4]

But Paris did not detain him long. His precise itinerary for some months is uncertain; but wherever he may have spent the intervening time, most authorities agree from the evidence of various letters still extant that he was in Rome in January, 1666, and that he was settled in Florence by May 18th of that year.[5]

In Florence Steno immediately felt at home, and as time went on he loved his adopted city more and more. He was attached in various official capacities to the court of Ferdinand II, Grand Duke of Tuscany, had a comfortable income and ample opportunity for scientific investigation and, as usual, drew to himself the affection and esteem of the best and finest men in the city. In this congenial environment he produced some of his most important work, and here paleontology served as a bridge for him to cross, temporarily at least, from anatomy to geology to which his contributions were of such importance as to earn him the title of "Father of Geology" in its modern sense.

Still greater was another change which came to him in Florence, for it was at this time that his increasing preoccupation with religion bore its first fruit, his conversion to Catholicism. And, with fine irony, on the very day on which he formally abjured the Protestant faith, there came to him a call to a position at the University of Copenhagen, a call which he was unable to accept without special arrangements since Denmark did not then enjoy religious freedom. After various delays, during which Steno was once as far toward home as Amsterdam and then returned to Florence, he finally received a second invitation, not to a professorship, for no Catholic could hold such a post, but to a position created especially for him as *Anatomicus Regius*. He reached Copenhagen in 1672, reopened there the anatomical theatre which had been closed for some time, and for two years conducted demonstrations of dissections in it. But he was not happy; his heart was no longer in his work, and his change of religion subjected him to much unpleasantness. In 1674 he gave up the unequal struggle and returned to Florence where, the following year, he at last surrendered all interest in science and became a priest of the Church.

[4] Cited from Plenkers, p. 26.

[5] The article on Steno in the eleventh and thirteenth editions of the Encyclopedia Britannica, however, is clearly in error when it says that he was professor of anatomy at Padua before coming to Florence. Not only was there no time in the interim for such an appointment, but the *Fasti Gymnasii Patavini* of Facciolatus do not contain any record of his name. As Winter (*The prodromus of Nicolaus Steno's dissertation*, p. 175, note 2) has remarked, the article also errs in giving the date of his birth as 1631. The fourteenth edition of the Encyclopedia omits the article altogether. For an excellent discussion of Steno's probable itinerary, see Scherz, "Niels Stensen."

His life from that time forward was one of extreme piety and zeal for the advancement of Catholicism. He was soon raised to the episcopate as titular Bishop of Titiopolis, and Vicar Apostolic of Northern Germany and Scandinavia, and in this capacity lived successively in Hanover, Münster, Hamburg, and finally Schwerin, laboring among his people with self-denial and unremitting ardor. He spent his entire fortune for the relief of the poor and was reduced to miserable penury, fasting inordinately, wearing only dirty, ragged clothing, and refusing in every way to live as became his rank. He seems to have lost all sense of proportion and with it his tact, for although there were some who admired him for his undeniable virtues, he succeeded in antagonizing so many with his unmerciful strictness and stinging rebukes that he made himself cordially hated even by his own people. It is said that in Hamburg his enemies among the Catholics threatened to cut off his ears and nose, to drive him out of the city like a criminal, and finally to kill him. All this he bore with the most Christian patience, and continued to labor all the harder under the most painful conditions until his death in Schwerin in 1686. His body was taken back to Florence and buried in the crypt of the Church of San Lorenzo.

Space is lacking for any proper appraisal of his many scientific achievements, but even a mere list of the more important ones is impressive. He contributed largely to our knowledge of the glands and their function. Together with Malpighi, the discoverer of the capillaries, he furnished the capstone for Harvey's great work on the circulation of the blood when he proved that the heart is a muscle, and nothing but a muscle, and therefore not a substance *sui generis,* nor the manufacturer of a mysterious something known as the vital spirits. To his analysis of the brain I have already referred. In the field of embryology, apart from his discovery of the vitelline duct, Steno is remembered for his recognition of the fact that the mammalian ovaries, heretofore known as the *testes muliebres,* are not female testes, but homologues of the ovaries of the ovipara, and for his suggestion that the ova (by which he meant the Graafian follicles) *or their contents* are discharged into the uterus. But perhaps Steno's claim to greatness rests most securely on his attainments as a geologist. He was one of the first, if not the first, to give a valid explanation for the occurrence of fossils, in a day when their interpretation as imperfect attempts on the part of the Creator was only one of the ingenious theories explaining them. Thence he was led to consider the formation of the sedimentary strata containing the fossils and he concluded correctly that whatever their present situation, they must have been laid down in a horizontal position beneath the surface of water. When one adds

to all this his brilliant work on the nature and growth of crystals, it is easy to understand why geology as a science looks upon him as its founder.

With such a large body of solid accomplishment to his credit, it is possibly ungracious to point out a certain haphazard quality in Steno's work. As Maar says,[6] he seldom seemed to choose his own material but worked on whatever chance cast in his way; certainly he had little singleness of purpose, nor any goal toward which he consistently strove. Repeatedly he let himself be distracted from a problem before he had completed all he had in mind to do, and on occasion he published his findings as a Prodromus, or preliminary sketch, never to be followed by the intended major dissertation. He himself admits and deplores this characteristic in his work, blaming circumstances over which he had no control, and making this rather lame excuse: " . . . certainly if I had tarried longer in working out one discovery, I should myself have shut the door to the finding of the rest."[7]

In 1664, while Steno was at home after his years in Holland, he published in Copenhagen and also in Amsterdam a book entitled *De musculis et glandulis observationum specimen cum epistolis duabus anatomicis.* The first and principal treatise in the book is that in which are found both a report on his first work on the muscles, including his views on the muscular nature of the heart, and a summary of his accomplishments in the investigation of the glands. The first of the two "anatomical epistles" is addressed to Willem Piso, a Dutch physician, and deals with the dissection of a ray which took place in Steno's presence at the home of Simon Paulli in Copenhagen. The other letter, addressed to Paullus Barbette, another physician friend in Holland, is the *De vitelli in intestina pulli transitu epistola,* and in it Steno announces his finding of the vitelline duct or *ductus intestinalis.*

He begins with some reflections on the care necessary in anatomical research. Then, very simply and clearly, he describes the structure and tells how he happened to find it while intent on something else. He concludes with a discussion of the effect his discovery must have on the whole problem of the mechanism of nutrition which at that time was the subject of earnest, not to say acrimonious, debate. The observation is acute, the exposition lucid, and the reasoning close and logical—an excellent scientific presentation, but perhaps the most remarkable thing in it is Steno's unaffected amazement at his discovery. For a knowledge of the vitelline duct should have been a part of his scientific background and that of every reader of Aristotle who describes it in the third chapter of the sixth book of his *Historia animalium.* True, Aristotle erroneously attributes its origin to one of

[6] Maar (Steno), I, xi.

[7] Steno, *The Prodromus,* p. 208.

the blood vessels arising from the heart, but his description is nevertheless, one would think, unmistakable. He says:[8]

> . . . and about this time [the twentieth day] is plain to be seen the membrane resembling an after-birth that comes next after the outermost membrane of the shell, into which membrane the one of the navel-strings was described as leading (and, by the way, the chick in its entirety is now within it), and so also is the other membrane resembling an after-birth, namely that surrounding the yolk, into which the second navel-string was described as leading; and both of them were described as being connected with the heart and the big vein. At this conjuncture the navel-string that leads to the outer after-birth collapses and becomes detached from the chick, and the membrane that leads into the yolk is fastened on to the thin gut of the creature, and by this time a considerable amount of the yolk is inside the chick and a yellow sediment is in its stomach. . . . By and by the yolk, diminishing gradually in size, at length becomes entirely used up and comprehended within the chick (so that, ten days after hatching, if you cut open the chick, a small remnant of the yolk is still left in connection with the gut).

Now Steno was, of course, perfectly familiar with this passage; in fact he refers to it specifically (see page 133) but misinterprets it by supposing, apparently, that Aristotle was referring to the blood vessels of the umbilical cord which adhere in their course to the small intestine. Certainly, as the context shows, he had no idea that in Aristotle's mind, also, the yolk " . . . has its own special duct by means of which it is attached to the intestine."

In our serene possession of the hindsight that is so much easier than foresight, we may wonder at Steno's error but we should beware of blaming him too severely, for he was not alone in it, but one of a decidedly exalted company, all of whom made the same mistake. Aldrovandus, Fabricius, and Spigelius were great names in the embryology of the half century before Steno, and in none of their works, nor in those of William Harvey himself, is there any indication that any one of them had the least inkling of the existence of the vitelline duct. They were all thoroughly versed in Aristotle's account of the developing chick, and they one and all completely misunderstood the passage I have quoted which could have given them the clue.

Their failure is the more surprising because in the long interval between Aristotle and Steno there was one man who had perhaps understood it, and another who had also actually seen the duct. The first of these two was Albertus Magnus, the eminent scholastic philosopher and encyclopedist of the thirteenth century. The account of the development of the chick which he gives in book six, chapter four, of his *De animalibus* is merely, like most of his work, an amplification of Aristotle's text, well seasoned with Galenic physiology, and all probably derived from Arabic sources. His own

[8] Aristotle, *Historia animalium*, VI, 3, 561b 30–562a15.

mental attitude and the whole spirit of his times make it extremely unlikely that he ever undertook systematic inspection of incubated eggs; indeed, it would be unwise until we have a fuller knowledge of all his sources even to say that his occasional apparently independent statements do really reflect actual observations of his own. He paraphrases and expands Aristotle's references to the vitelline duct in a passage the Latin of which is so corrupt and obscure that it is difficult to determine what he meant or how much he understood.[9] But there is no room for uncertainty when we come to Volcher Coiter, sixteenth century anatomist, pupil of Aldrovandus, and the first since Aristotle to make and record daily observations of the chick embryo. He undertook the study at the suggestion of his teacher and published his findings in 1572 in a treatise entitled *De ovorum gallinaceorum generationis primo exordio progressuque, et pulli gallinacei creationis ordine,*[10] a work remarkable for its dispassionate objectivity and freedom from the clutter of scholasticism. From the seventeenth day on, he mentions the vitelline duct repeatedly as "an outgrowth from the intestines to the yolk," "passages[11] extending from the intestines to the yolk of the egg," and a "canal" joining the yolk to the intestines.

It seems strange that anyone familiar with this dissertation could fail to realize what Coiter meant and expressed so clearly; especially is it incredible in the case of Aldrovandus, who, Coiter tells us,[12] was actually present at the dissections when the observations were made. But nearly a hundred years later, when Steno was reproached for having claimed Coiter's discovery as his own, he could write in a letter to Thévenot[13] that the duct was described so obscurely that neither Harvey nor any of the other anatomists of that age, although they studied Coiter with care, could arrive at so much as a suspicion of it.

Three years after the publication of Steno's *De vitelli . . . transitu,* there appeared Walter Needham's *Disquisitio anatomica de formato foetu.* In it he describes the vitelline duct in detail and argues that it is functional. Then he goes on to say that he had first observed it himself thirteen years before, in 1654, and had showed it to various men, among whom were Glisson, Willis, Millington, Lowe, and Robert Boyle. Glisson, he says, readily recog-

[9] Albertus Magnus, *De animalibus,* VI, 4, ed. Stadler, I, 456.

[10] In *Externarum et internarum principalium humani corporis partium tabulae . . .,* Noribergae, 1572. See also Adelmann (Coiter).

[11] The Latin is *meatus,* plainly an accusative plural. Needham (pp. 95–96) also describes the duct as a single trunk formed by the junction of several roots which take their rise from the yolk. Adelmann (Coiter, p. 455) mentions Steno's use of the plural in referring to the duct, but I have been unable to find such an occurrence.

[12] Adelmann (Coiter), p. 444.

[13] Steno, *Opera philosophica,* II, 95–96. In *Elementorum myologiae specimen seu musculi descriptio geometrica,* Florentiae, 1667.

nized it as a structure with which he had long been familiar. Needham goes so far as to suggest that Steno had learned of the duct from others before he found it himself but concludes somewhat ungraciously that Steno was probably acting in good faith, and that "he [Steno] owed it to his good fortune and his industrious devotion to anatomy that he happened to be lucky equally with Needham in finding the duct, and even luckier in the publishing of it."[14]

No one doubts either that Needham had really seen the vitelline duct when he says he did or, on the other hand, that Steno was perfectly sincere in believing himself to be the first to observe it. As Maar points out,[15] to claim another man's work as his own would be an act utterly at variance with all that we know of Steno's character, even if he had not at the time only just emerged from an experience (the controversy with Blaes over the parotid duct) which had taught him what pain and trouble might attend such scientific plagiarism.

Finally, in the same letter to Thévenot, Steno wrote that according to letters he had received from his friends there were two other men, Meibomius and Huibertus, who were claiming to have found the vitelline duct before him. According to Maar, nobody by the name of Huibertus has been identified among the investigators of that period, and nothing of the sort has been found in the writings of Heinrich Meibom, the German physician who lived from 1638 to 1700. Obviously, as Maar suggests, they could have observed it without publishing anything about it.[16]

It is interesting to note that in 1667 Steno also saw the vitelline duct in a shark; but although he compared it to the similar condition in the chick, he did not realize that the little cavity or "receptacle of the placenta," as he calls it, to which the canal led was actually the yolk sac.[17]

During the period from Needham in 1667 to Haller in 1758, there is frequent mention of the vitelline duct in the literature, and those who observe it all assume with Steno that it is functional. Thomas Bartholin is the only one besides Needham to mention Steno's name in connection with it when he says: "The usefulness of the small intestines lies in the further concoction and distribution of the chyle in transit. Indeed, that chylification occurs here as well as in the stomach is the opinion of Steno, based on his study of the chick, in which he observed after Coiter that the tunic of the

[14] Needham, pp. 95–98.
[15] Maar, 5, 263.
[16] *Ibid.*, p. 257.
[17] *Ibid.*, pp. 258–262. Maar thinks that the observations were made in 1667. They were published in 1675 as an article in the *Acta Hafniensia* of Thomas Bartholin under the title, *Ova viviparorum spectantes observationes.*

yolk is joined to the intestine by a special duct, and that the yolk's fluid is conveyed into the intestines by this route."[18]

Schrader in observations made in 1667 and published in 1674 saw the duct first on the fifteenth day of incubation and much more clearly on the sixteenth. He accompanies his mention of it by a figure showing the two-lobed yolk, a very short duct, and a short portion of the intestine. His note on the fifteenth day reads: "A slender little canal made its way from the yolk into the middle part of the intestines, as is evident from Figure VI," etc., and on the sixteenth: "The duct proceeding from the yolk to the intestines was much more apparent and seemed to be an extension of the yolk's investment."[19]

Marcello Malpighi, writing in 1673, states that he observed the duct in use when the chick was ready to hatch, referring to it thus: "The upper portion of the intestines was filled with a greenish juice; the lower portion, however, was full of a cinereous humor and it received fluid from the short patent vitelline duct." He also makes the interesting suggestion that the nutritious parts of the yolk may be conveyed by the umbilical vessels and the duct may serve for the discharge of the excrementitious residue into the intestines. Later, in additional observations published in 1675, he provides an excellent illustration and again mentions having seen the duct late in incubation.[20]

In 1674 Matthew Slade, writing under his pseudonym of Theodore Aldes, records finding the vitelline duct on the seventeenth day of incubation, and later, under the heading, *Exitus pulli ex ovo,* he makes the interesting comment: "Before hatching the little tube of the yolk did not allow yolk to pass through, although it was squeezed; immediately or within two days after hatching we found in a duckling that the little tube was pervious and (when it was squeezed) admitted yolk." Also, in a short note entitled *Sciagraphia nutritionis pulli in ovo,* he dissents from Harvey's theory of the chick's nutrition, and says: . . . "But at the end [of incubation] and when it has just broken the shell, it is nourished by the yolk carried through the little tube into the intestines and conveyed to the viscera."[21]

Maître-Jan in his *Observations sur la formation du poulet,* published in 1722, pays a great deal of attention to the *"canal de communication,"* as he calls it.[22] He found it first on the fifteenth day, though with great difficulty because of its delicacy, and, by blowing on a tube inserted in the throat he

[18] Bartholinus, *Anatome,* p. 85.

[19] Schrader, p. 180.

[20] Malpighi, *Dissertatio,* p. 24, and *De ovo incubato,* pp. 10–11.

[21] Aldes, *I,* 734–738.

[22] The observations relative to the vitelline duct will be found on pp. 227–229, 262, 269, 275, 277, 282, 284, and 286–292.

was able to see the oesophagus, stomach, intestines, and finally the yolk sac by way of the duct successively inflated. On the eighteenth day the canal was much more prominent, and although he found no yolk in the intestines, he is sure that it is only because the yolk particles are not yet sufficiently rarefied to pass through. By the twentieth day the chick's own heat together with the heat furnished by incubation has accomplished the necessary thinning out process, and yolk is consequently found in the intestines. The umbilical vessels, however, continue their activity for some time; Maître-Jan thinks they transmit the more subtle portion of the nourishment. He traces the gradual decrease in the size of the yolk after hatching until there is nothing to be seen of it but the diverticulum on the surface of the intestines.

Finally, Albrecht von Haller, whose account of the development of the chick was published in 1758, also has much to say about the vitelline duct[23] which he saw first on the fourteenth day. He watched carefully for evidence that the yolk was actually passing into the intestines; indeed, on the twentieth day he tried without success to force yolk through the passage, but on the twenty-first, as the chick was hatching, he was convinced that the duct was in use. He says quaintly: *Ce n'est guere, que le dernier jour de l'incubation, que le Jaune est repompé dans les intestins, & il acheve de s'y repandre les premiers jours après qu'il est éclos, pendant que le poulet trop tendre ne peut apparemment soutenir la nourriture solide, que la nature lui présente, sa mère n'ayant ni lait, ni alimens tendres à lui fournir.*[24]

Apart from the story of its discovery, the vitelline duct has one other claim to the interest of the historian of embryology. As Cole has pointed out,[25] both Maître-Jan[26] and, following him, Haller[27] have used it to furnish evidence bolstering their belief in preformation, that theory which held that the rise of a new individual is not accomplished by a gradual development of previously unorganized material (epigenesis), but is rather simply the unfolding and enlargement of a fetus preëxistent in the germ, and unperceived only because of its minuteness and transparency. The preformationists were divided into two camps, the ovists who placed the preëxistent fetus in the egg, and the animalculists who considered it resident in the spermatozoon. Now when Maître-Jan and Haller examined the yolk, the intestines, and their connecting passage, they realized that the internal membrane of the yolk sac is continuous with the inner lining of the intestines, while its outer membrane is merely an extension of the peritoneum. Therefore the intestines of the chick, and so the chick itself, are an integral part of the yolk

[23] Haller, *Premier mémoire*, pp. 319, 336–338, 388, 391, 396, 405, 415, 417.
[24] Haller, *Second mémoire*, p. 158.
[25] Cole, pp. 79, 88–92.
[26] Maître-Jan, pp. 296–300.
[27] Haller, *Second mémoire*, pp. 186–188.

of the egg and came into being at the same time in the ovary of the hen, before fertilization by the cock. This ingenious reasoning and conclusion made of them convinced preformationists of the ovist variety and furnished more ammunition for the long and wordy battle waged between ovists and animalculists, and between both of them and the advocates of epigenesis.

In concluding these introductory remarks, I am happy to acknowledge my indebtedness and express my deep gratitude to Doctor Howard B. Adelmann of Cornell University who has generously given me access to his library, checked my translation, and aided me throughout with valuable suggestions and criticism. My thanks are also due to Professor James Hutton of Cornell University and Mrs. Elsie Myers who have reviewed the manuscript, and to Miss J. M. Tharpe of the staff of the University Library who has been most helpful in obtaining necessary material.

TRANSLATION

ON THE PASSAGE OF YOLK INTO THE INTESTINES OF THE CHICK
A LETTER ADDRESSED TO PAUL BARBETTE
PHYSICIAN MOST RENOWNED AND EXPERIENCED

Many are the rare discoveries this age has produced in the field of anatomy, and if these were to be accounted monsters, anatomy would not yield first place to Africa[28] in its numerous brood of prodigies. And why should you not call them monsters when they are so closely related to the monstrous? Some there are that merit exhibition[29] to everyone because their novelty excites wonder, and there is no dearth of those displaying real abnormality in that they violate the ordinary laws of Nature, but very often it is the impetuosity of the observer that invents a monstrosity when there is nothing abnormal in the case. So, too, there are many things that the Africans themselves admire, doubtless only because they consider that everyone ought to be shown that which no one has seen before. Sometimes, however, chance links together animals of different species as they gather at the com-

[28] Africa's reputation as the home of extraordinary animals was well established, even in Aristotle's day. He says (*Historia animalium*, VIII, 28, 606b15–20), "As a general rule, wild animals are at their wildest in Asia, at their boldest in Europe, and most diverse in form in Libya; in fact, there is an old saying, 'Always something fresh in Libya.'" See also Hippocrates, *Airs, waters, places*, cap. 12, tr. W. H. S. Jones, I, 109; Pliny, *Natural history*, lib. VI, cap. 35, tr. Rackham, II, 477–479; and lib. VIII, cap. 17, tr. Rackham, III, 33.

[29] [*Monstra*] . . . *merentur monstrari:* As Maar (p. 241) very properly points out, there are many places in these introductory remarks where the play on the words *monstrum* and *monstrare* defies neat reproduction in translation.

mon drinking places[30] and produces hybrids, just as Nature in her operations turns aside from her accustomed path sometimes in one way, sometimes in another, and brings forth offspring which to the Africans seem monstrous. But when the supposed deformity of the thing which appears throws them at first glance into instant flight, quaking with terror, they often imagine a monster a thousand times more deformed than what they actually saw (which was perhaps nothing short of monstrous). This is the way with morbid and superstitious persons; I cannot think what terms for specters and portents they do not use to describe any meaningless noise, the delusive shapes and colors of the clouds, often even their own shadows, and other trivial causes of childish terror, and they have no trouble in persuading the credulous that they have truly seen prodigies when, in fact, the actual appearance was far different. Now just as fright deceives the Africans and the credulous, so does joy trick anatomists when some observation which at first sight is unusual, favoring their preconceived opinion or offering a point of departure for a new line of thought, impels them to redouble their *eurekas* and leaves no room for pursuing a more careful investigation. There are sometimes still other impulses of the mind, here to be passed over in silence, that have caused many to father monstrosities in their writings. It would be invidious to illustrate my meaning with modern examples,[31] while one who brought forward examples culled from the ancients would seem to be denying them their due respect. Nor is there need to seek elsewhere for a fault which is easy for any one of us to detect in himself. For I do not believe that anyone who is not too slight or too casual a student of anatomy will deny that just as he does occasionally observe some new things and some that are extraordinary, so he not infrequently persuades himself that he has seen what he has not.

And when those who are striving to gain an understanding of animals through experimentation are carried away by the rash impulses of their minds as if driven by a sort of whirlwind, what wonder is it that many anatomical monstrosities are hawked abroad which are never to be found by others, no matter how assiduously they may pursue the search? Unless

[30] Steno is referring here to Aristotle, *De generatione animalium*, II, 7, 746b7: "And the proverb about Libya, that 'Libya is always producing something new,' is said to have originated from animals of different species uniting with one another in that country, for it is said that because of the want of water all meet at the few places where springs are to be found, and that even different kinds unite in consequence."

[31] This may be intended as an allusion to Steno's recent opponents in Holland where he had engaged in two brisk disputes, one over the priority of his discovery of the parotid duct, the other over the general interpretation of his work on the glands. The *De vitelli . . . transitu* was published in 1664, just after his return to Copenhagen after a four years' sojourn in the Netherlands.

the mind is tranquil, it will by no means be free to apply itself to a close examination of facts which can and ought to be closely examined, and unless every least detail is noted in so far as the minuteness of the object or its intricate diversity allows, the pathway to error is downhill[32] and very easy. Therefore, just as in all dissection there is need of great and heedful attention, lest of its own accord the straying mind should distract the far too agile eyes from the object before them, so the greatest caution must be exercised when anything is encountered at variance with the commonly accepted opinion, lest one should be deceived by outward appearances and shout his triumph before the victory.[33] For my part, I have been badly frightened by other men's records, and in any unusual observation I would not dare to put any trust in my own eyes unless, after very frequent and repeated examinations of the same thing, they also had as witnesses of the observations the eyes of others having expert knowledge of the point in question. And if, accordingly, you should come upon anything resembling a monster in these pages which you are now about to read, you may confidently believe that it has been examined by the eyes of men most highly trained in anatomy.

I myself began by putting it down as a monstrosity when I observed *that in the chick the nutriment, hitherto believed to be received from the yolk by the umbilical vessels and conveyed to the portal vein, is taken from the tunic of the selfsame yolk through a duct of its own directly to the middle portion of the intestinal canal.* It has seemed ridiculous to many for the chick to be nourished by mouth; how much more ridiculous for it to be nourished by way of the intestines themselves, especially since even the eyes of the mind have never imagined that this occurs in any condition of life! Now many[34] have thought and still think that while the animal is living in the fluids without air, nutrition is accomplished by means of the umbilical veins; others teach that the liquid in which the fetus floats is conveyed into its body only through the mouth. In the perfected animal, the mouth is

[32] See Ovid, *Metamorphoses,* II, 67.

[33] An ancient proverb of distinguished ancestry. Plato used an approximation of it twice, once in Lysis (Bekker, *Platonis dialogi,* Part I, Vol. I, p. 113 [205]), and again in Theaetetus, (*Ibid.,* Part II, Vol. I, p. 223 [164]). Thereafter it is listed, still in Greek, by such collectors as Diogenianus, Gregorius Cyprianus, Apostolius, and Arsenius; see Leutsch and Schneidewin, p. 296. I have not found any occurrence in Latin literature before Erasmus, where it appears in the *Adagia,* I, 7, 55 (*Opera omnia,* Vol. II, col. 283D), with his comment: *In eum, qui praepropere gloriatur, re nondum confecta.* Steno uses it once before in his *Nova musculorum et cordis fabrica* (see Steno, *Opera philosophica,* ed. Maar, I, 159); indeed, it is a sentiment which could be expected to have a strong appeal for him, since, as this treatise amply demonstrates, he had the scientist's lively horror of rash statements unsubstantiated by fact.

[34] For a summary in tabular form of the different theories of fetal nutrition held by various scientists in the seventeenth century, see J. Needham, pp. 158–160.

known as the entrance for different kinds of sustenance where not only solid and liquid foods descend through the oesophagus, which is the common opinion, but also, equally with all the other spiracles of the body, airy spirit is drawn in by the lungs, as certain chemists do not so much conjecture as maintain.[35] There are stories of many sick persons who have prolonged life for some days by odors alone,[36] and of not a few who have derived benefit from nourishing clysters. But to whom would it occur even in a dream that there is any condition of life in which aliment is poured into the midst of the intestines?

Therefore, the stranger and more paradoxical it seemed, the more carefully I have thought it should be studied, until every doubt and every fear should be removed by observations always consistent in every subject I examined, so that I might avoid hawking abroad fiction for truth, and for the normal, something monstrous. These observations are as follows:

In the egg, both albumen and yolk have their own membranes,[37] in both cases provided with blood vessels; of these membranes, the one surrounding the albumen is destroyed when the egg hatches, but the other is taken inside the abdomen and is found in the chick for a long time, even later than the thirtieth day after hatching according to the observations of Harvey.[38] Aristotle[39] calls the vessels of each membrane an umbilical cord and thinks that the one running to the yolk is attached to the small intestine; but whether the yolk hangs down outside the abdomen, or whether

[35] Perhaps Steno is thinking of Paracelsus, who says, "As the stomach concocts the aliment, and makes part of it useful to the body, rejecting the other; so the lungs consume part of the air, and reject the rest." Quoted from Boyle, *Spring and effects of the air*, Philosophical Works, II, 468. In Steno's time the physiology of respiration was a subject of eager interest and investigation. For a masterly account of the slow advance in the understanding of it during the seventeenth century, see Foster, pp. 172–197.

[36] I have not been able to find any source for these stories, though the idea of nourishment by odors is an old one, going back to the phoenix, that fabulous bird which was said to live for five hundred years on air tinctured with frankincense and other odoriferous gums. Hippocrates (*Nutriment*, cap. 50, tr. Jones, I, 361) says that for those who need a very quick reinforcement of strength, a remedy by means of smell is best, and Galen, commenting on this statement (*Commentary on Hippocrates De alimento*, lib. 4, cap. XXVII, Kühn, XV, 414–415), says: "It is written in the Aphorisms, 'It is easier for bodies to be filled with drink than with food.' . . . Hence it comes about that moist foods and fluids are best for those needing a quick presentation [of nutriment]. But if they need it more quickly, we should use odors to help them. . . . The reason is that sweet odors contribute something or other to the body, regulate its temperament, and strengthen that natural heat in which we say our life resides."

[37] Here Steno must mean not the shell membranes and the vitelline membrane of the unincubated egg, but rather the allanto-chorion and the yolk sac.

[38] Harvey, *Exercitationes*, Ex. 21, p. 69. On p. 263 of the 1847 English version by Robert Willis, *tricesimum* is erroneously translated as "thirteenth." Harvey later (Ex. 52, p. 164) reports finding a remnant of the yolk six weeks after hatching.

[39] Aristotle's two descriptions of the developing chick are found in the *Historia animalium*, VI, 3, 561a–562a, and *De generatione animalium*, III, 2, 753b15–754a20, the former being the more detailed account. Steno here comes close to realizing that Aristotle did describe the vitelline duct with its attachment to the small intestine. See my Introduction, p. 125.

by the gradual drawing together of the abdominal wall it is retracted and lies hid within, it has its own special duct by means of which it is attached to the intestine. Blood vessels passing over the middle portion of the intestine crowd against it on both sides, and so it happens that by enveloping this third duct the blood vessels have hindered its discovery. The tunic of the yolk resembles a little sac with a large cavity but a very narrow mouth, from which a little vessel leads to the intestines at a point about half way between their beginning and end; it is scarcely as thick as the blood vessels, and moreover is the color of a ligament, so that you would think it a nerve, were it not that the passage of liquid proves it pervious. The way in which it enters the intestines does not differ from the insertion of the pancreatic duct, except that the latter is attached to the intestines on the same side as the mesentery, whereas the yolk finds an open passage on the opposite side. By this passageway the yolk is poured into the intestines after it has been liquefied and converted into a clear fluid, the containing sac diminishing gradually along with its contents until finally, when all the juice has been used up, there will adhere to the intestine an elongate, hollow tubercle, which is the only trace of the yolk permanently remaining, so that by means of it the place where aliment was taken in through the intestines can be demonstrated even in adults.[40] But in order to be so much the more certain of the truth of the matter, I laid open the intestine and saw that when I squeezed the sac, at first a somewhat thin liquid, followed later by a thicker one, ran out through the little vessel I have just described; and since this always happened in the same way whenever I tried it, I finally came to the conclusion that this passage is the one by which the yolk enters the body of the chick, and that the process called chylification actually takes place in the intestines as well as in the stomach.[41] But, to make this whole matter

[40] This structure, though here first described and correctly interpreted by Steno, is called Meckel's diverticulum from its description in 1821 by Johann Friedrich Meckel (the younger), pp. 193–194.

[41] Steno takes for granted that the vitelline duct is functional and not merely an accident of development, whereas modern opinion has inclined to the latter view. Virchow, the classic authority on yolk absorption, thought it possible that yolk is taken into the intestines through the duct since he found it open at both ends and noticed its increase in size at the time of the greatest absorption of yolk, but he decided against it because he failed to find traces of yolk in either the canal or the intestines at any stage of development. Wislocki injected trypan blue into the yolk sac of chick embryos of eleven days' incubation and opened the eggs forty-eight hours later, finding that the dye had been freely absorbed by the endodermal epithelial cells lining the interior of the yolk sac, and had reached its final destination in groups of cells surrounding the rich venous network in the yolk-sac wall. But as regards the vitelline duct, he says, "It is of interest to note that in spite of the fact that throughout incubation the yolk-sac possesses a connection through its stalk with the intestine, none of the dye injected into the sac enters the intestine through this opening." Knake, however, using the same technique with day-old chicks, found that at that stage the dye (and presumably the yolk) passes through the duct and stains the intestinal contents, although prior to the nineteenth or twentieth day of incubation the intestines are empty.

more fully evident, I will briefly set forth the circumstances which led me to an investigation of it.

Uncertainty over the office of the liver has long kept me in doubt, and even to this very hour it has not been granted me either to observe experimentally or to learn from any other source facts sufficient to settle that celebrated question[42] beyond all doubt. Since those who refer everything to reason alone, because they are so clever, seem to proclaim each his own opinion in all but dictatorial fashion, and since those who differ a whole sky's width from one another in the way they solve the problem are alike confident in their proofs, anyone who is avoiding mental bias and is not an adherent of any doctrine will not easily be able to divine which of the many opinions he may safely adopt as the more certain. But those who have devoted themselves entirely to experimentation[43] are so far from removing every uncertainty that they have made the whole problem much more perplexing, while they either heedlessly disregard the rules prescribed by that method of searching out truth or knowingly and wittingly reject them for the sake of an opinion laid hold on once and for all, which they fasten upon and cling to forever as to a rock, referring everything to it, both what they have seen and what they have not. In no other matter is this tendency more clearly evident than in undertaking an inquiry into the route of the chyle. After the true route of the chyle and lymph had at length been established, although experiment seemed to have removed the logical difficulties, and the diligence of those copying the same procedure to have exposed the falsity of many of the experiments, the following considerations nevertheless remained to make uncertain the mind striving after truth. First, it was not clear that all the chyle is conveyed by this route,[44] since observation

[42] The resistance of the human spirit to change is nowhere better illustrated than by the controversy, long and bitter, which raged throughout scientific circles about this time, when the discovery of the lymphatic system, lacteals, and particularly the thoracic duct had made necessary a new theory of nutrition. Many clung stubbornly to the Galenic idea that the products of digestion are conveyed only through the mesenteric veins to the liver where they are transformed into blood, while others were just as obstinate in asserting that chyle is carried only via the lacteal vessels and thoracic duct to the azygos vein, and that the liver had therefore become unimportant. The general tone of the discussion may be gathered from the titles of their dissertations, such as Thomas Bartholin's *Vasa lymphatica . . . et hepatis exsequiae,* Hafniae, 1653, Deusing's *Vindiciae hepatis redivivi,* 1661, and Bartholin's *Responsio de . . . difficili hepatis resurrectione,* Hafniae, 1661. Cited from Maar, *Nicolai Stenonis opera,* I, 236, 237, 239.

[43] It is difficult now to realize the very real antagonism that existed between the advocates of reason and those who put their faith in experiment. For example, More (p. 97) tells us that Hobbes sneered at Boyle for submitting to the immense waste of time and effort in experimentation when any ingenious mind could arrive at true conclusions about natural phenomena by cogitation.

[44] This statement and the whole succeeding discussion bear testimony to Steno's level-headed moderation in the midst of controversy, and his ability to make just and logical deductions from known facts. He is to be praised for his refusal to be drawn into active partisanship, and his realization that the truth probably lay somewhere between the two extremes.

showed only that the part of the ingested nutriment that filters through the tunics of the intestines is sent through the lacteals up to the vena cava; and now who will vouch for it that all the remainder passes into excrement? Who has convicted of error all those who believe that the office of the veins is not only to carry back the blood transfused from the arteries, but also to convey to the heart along with the blood any substance fit to enter their orifices?[45] And if you allow that this happens in all the rest of the body, what reason is there for denying something similar to the intestines? This uncertainty is accompanied by another of no less importance, namely, that an investigation of this same matter certainly has not been made in every kind of animal. Now if, therefore, animals are to be found which have not been provided with lacteals, or if a time of life is to be observed when the blood vessels convey straight to the liver the nutriment taken in at their extremities, why should not like conditions be granted to other animals also, especially as long as nothing has been found to prove the contrary? How momentous this doubt—to pass over the many others I could adduce derived from this source—should be considered, although few have remarked upon it, the single example of Harvey will show. He refused to acknowledge the existence of lacteal vessels because he believed that in birds the yolk is carried through the umbilical vessels to the liver. Hence, in Exercise 21[46] he says: "And if the argument based on the course of the umbilical veins (which I have said end in one or two trunks at the porta of the liver) holds good, the chick then is nourished by the attraction of aliment from the yolk through the umbilical vessels in exactly the same way as it is later nourished by the chyle brought from the intestines through the mesenteric veins. For in both cases the vessels end at the porta of the liver, to which they convey the aliment that each has attracted. Thus there is no need to resort to lacteal veins in the mesentery (which are nowhere found in birds)."[47] These words have caused me no little trouble since I decided that if the veins discharge this office in the chick, the privilege ought not lightly to be withdrawn from them in other animals or at another time of life. Hence it is that I have never ventured to oppose the liver, although I have never been one of its partisans; for the authority of Aristotle and Harvey weighed so heavily with me that I allowed as an established fact

[45] From his manner of expressing his thought here it is evident that Steno was still unaware of Marcello Malpighi's discovery of the capillaries three years before. Otherwise, he would hardly have spoken of the orifices of veins or of the blood as transfused from the arteries. See Malpighi, *De pulmonibus,* Bononiae, 1661. (In *Opera omnia,* Epistola II, p. 329.)

[46] Harvey, *Exercitationes,* pp. 69–70. Willis corrects the numbering of the Exercises so that in his edition this passage is found under Exercise 22 on p. 263.

[47] An error on Harvey's part. Lacteal vessels do, of course, occur in the mesentery of birds.

that idea about the diadosis[48] of the yolk into the liver through the umbilical vessels, especially since I saw that it was not inconsistent with reason.

But since in their accounts I failed to find what happens after the yolk has been exhausted from the sac, and certain other points of no great importance, indeed, but nevertheless contributory to a full review of the facts, I took from a brooding hen one of her eggs, whose shell had just been broken by the chick making haste to hatch.

When the investments had been stripped off, the swollen abdomen betrayed the presence of the yolk lying hid within. I will not recount the facts, more agreeably to be noted by observation than by reading, about the way in which the abdomen is enveloped by the investments, but leaving all that, I will say that while in simple faith I was searching for the passages followed by the yolk from the sac to the liver, the passage I was not seeking from the same sac into the intestines offered itself unbidden to me for discovery. Thus the dicta of other men are too often oracles for us until a more careful examination reveals how far removed they are from the truth. I had read the words of Harvey confirming the opinion of Aristotle, and I saw that reason favored them both, with the result that not even the least suggestion of a doubt occurred to me until the whole structure was, as it were, overturned in a moment by my own observation, which was the direct cause of rendering the throne of the liver now all the more shaky by the withdrawal of this prop also.[49] For since any fetus takes by mouth the liquid in which it floats, and the chick takes the albumen by mouth[50] and the yolk in its intestines, I see no evidence which proves conclusively that part of the humors are conveyed to the liver through the umbilical vessels rather than to the heart, although we are by no means without facts which give apparent support to the idea. Now I am not actuated by partisanship for the organs, nor have I ever declared war on the liver, but I have asked of its defenders nothing more than that they should cite experiments to bolster the inventions of their reason. Hence, although we might, now that we have clear and open passages for the aliment, set the following limits to the office of the umbilical vessels, that by their heat and perchance by whatever liquid eventually seeps through the ends of the vessels, they merely make the humors suitable for nourishing the body, but convey no humors into

[48] Diadosis is the word used by Galen to signify the distribution of digested aliment to the bodily parts. See *On the natural faculties*, II, 6, tr. Brock, p. 163.

[49] This figure of speech is reminiscent of Steno's letter to Thomas Bartholin dated September 12, 1661, in which he says, "The true motion of the lymph, which you were the first to observe, has cast down the liver from its throne." In Steno, *Opera philosophica*, I, 55–56.

[50] It is the amniotic fluid which is swallowed by the chick, but if we bear in mind that after the eleventh day of incubation there is a connection between the albumen sac and the amniotic cavity, there is, perhaps, some justification for Steno's remark. See Lillie, pp. 217–220.

the body, nevertheless, while the dispute over what the mouths of the veins receive is yet unsettled—whether it is only blood, or in addition to blood, any suitable substance applied to their pores—to proceed to such a point of boldness would seem an unsafe thing to do.

Moreover, it is an inquiry of no little importance when we investigate the way in which any substance applied to a part of the body transmits its particles into the body. There are veins which can receive them, and in many animals there are not lacking lymphatics to which some have assigned the same office; but if indeed you mean that there is penetration through the pores of the skin, membranes, muscles, and bones to the inmost viscera, you must in this event understand simply this: either the material is subtle, as in bodies actually[51] hot or cold, just as in magnetic substances too,[52] or the parts themselves are so relaxed by the force of disease that true diapedesis[53] occurs, unless, perhaps, the substance is so corrosive that it would force a way through everything in its path, even though it were iron. I will admit that the bile has been seen to stain the parts in its vicinity with a yellow color although the gall bladder was unbroken, that fluid has been observed to seep through the bladder of the ox, and that dust from the cut stone has been found inside a bladder hung up in a sculptor's workshop, although it could not have easily entered through the tightly closed orifice of the bladder; but a condition which is to be ascribed to fibers of membranes either relaxed by disease or dried out has no place in a living and healthy body where everything is replete with spirit and moisture. I see no reason, therefore, why strengthening poultices are placed over the region of the heart other than that the course of the veins from that part of the skin to the heart is shorter than if you were to apply the same poultice to the hands, seeing that otherwise anyone ordering a purgative dose to be held in a sick man's hands would have no greater difficulty in causing a

[51] Actually = *actu*, a term applied to qualities readily perceptible to the senses, not merely present *in potentia*. Blanchard (*Lexicon*) says: *Actus . . . etiam de medicamentis dicitur, quae sunt actu calida, vel frigida, et non tantum potentia, id est, non possunt tantum talia esse, sed ipso effectu revera talia existunt.* The distinction goes back to Galen. See Castellus, *Lexicon*, and Adelmann (Fabricius), p. 727.

[52] A reference to the "imponderables," those indefinable, weightless substances whose existence was assumed in order to account for the phenomena of combustion, electricity, heat, and light. Thus, caloric was supposed to be the substance of heat and to flow from a warmer to a cooler body when the two were in contact. Phlogiston was a substance lost by bodies during combustion. One spoke familiarly, if vaguely, of electric and magnetic fluids, and the ether, longest lived of the group, was conceived as necessary to the propagation of light. Although these theories were developed in detail somewhat later, the general attitude of mind which fostered them is clearly indicated here. See Singer, p. 297 ff.

[53] Diapedesis is defined by Galen in his *De caussis symptomatis*, cap. 5 (Kühn, VII. 234), as a thinning or rarefying of the tunics of vessels, caused by disease, and resulting in the transudation of the serous portion of the blood. See also Galen, *De methodo medendi*, lib. 5, cap. 2 (Kühn, X, 311).

bowel movement than the one who smeared an ointment with the same faculty on the navel. Thus, neither in one place nor the other does any penetration at all take place through the pores of solids, but only a mixture with the blood of particles received by the vessels which produces the desired effect. Cantharides[54] behave in the same way, and true poisons no differently. But it would be a long task to unravel every problem involved in this general question. Since, therefore, substances applied to the outside of the body are received by the mouths of the veins and follow their channels, why should not the fluids contained in the membranes of the uterus also offer a part of themselves to the umbilical vessels? This is plausible reasoning but it is not applicable in every case. For who would believe that the urine in the bladder is resorbed by the extremities of the veins when it has only just been secreted in the kidneys from the blood or, whatever is in fact the source, at least from other useful parts, a fact which otherwise anyone is altogether bound to concede, if he grants to all veins a structure such that they receive besides blood other substances applied to them, provided that these are fit to enter? For why does urine have greater penetrative force when it is applied externally and exhibits its strength there? With equal reason we might reach the same conclusions in the case of the bile and other residues. But if here you object that Nature abhors her own excrements in disgust, you will accomplish little, since it would detract greatly from her wisdom if she who deals so prudently with the bladder is caught being so improvident with the skin that in the skin she allows to be mingled with the blood what in the bladder she is unwilling to receive in the veins. Now if, on the other hand, you call to your aid the fact that phlegm coats the inside of the bladder, you would seem to be bringing forward a more appropriate reason. But if indeed you admit the presence in the urinary and gall bladders, or elsewhere, of obstacles preventing the junction with the blood of substances which enter freely in another part of the body, who will give us such full knowledge and understanding of the inner surface of the fetal membranes that he dares boldly to proclaim his opinion? Now just as the situation regarding the umbilical vessels is doubtful, so the truth is not sufficiently established concerning the branches of the portal vein, both for the reasons I have just given, and because I have

[54] Cantharides are "blister beetles," bright, iridescent, golden-green insects from half an inch to an inch in length. They were used, Castellus says, for preparing rubefacient poultices, and their internal use was recommended by some, but condemned by others because they were regarded as a sort of poison. See Castellus, *Lexicon*, Galen, *De antidotis*, lib. 2, cap. 7 (Kühn, XIV, 141), and the article on cantharides in the Encyclopedia Britannica.

not as yet seen either lacteals, lymphatic vessels, or conglobate glands[55] in the mesentery of birds or fishes; whether this has come about through faulty observation, or because of the absence of the structures in these animals, is a question I do not yet wish to decide. But if now it were established with certainty that there are animals whose intestines entrust all the chyle to the red veins of the mesentery for transport, you could not deny the liver a part of the chyle in other animals—and by chyle I mean whatever is separated from the ingested aliment and forced out through the tunics of the intestines into either lacteals or red vessels—unless you were to show that either the innermost villous tunic of the intestines, whose villi all face the center of this coiled tube,[56] or some other tunic, differently formed in different animals, commits to blood vessels in one animal what in another it has intended entirely for the lacteals. But let us leave unsettled that which is doubtful until a future day shall yield experiments that either restore a part of its former office to the liver or show that it is entirely unworthy of the honor of the chyle.[57] And yet it would add little to its dignity even if it did permit the free passage of all the chyle, since nowadays indeed many have ceased to believe that the solid organs (which either set the blood in motion or act as sieves for what is to be strained out of it) contribute anything toward forming or perfecting it.[58] But where have I been led by this discussion of the liver? I wanted to make known to you the route followed by the aliment in the chick, a route to me new and all but abnormal, and at the same time to point out the circumstances which led me to discover it. This did not admit of a sufficiently simple explanation without a consideration of the liver also, seeing that the umbilical vessels surround the yolk when it is contained in its own sac, and when it has been

[55] Franciscus de la Boë Sylvius, the eminent physician, anatomist, and chemist of Leyden, who was one of Steno's teachers during his stay in the Netherlands, classified the glands according to their form and structure as conglomerate or conglobate in a treatise entitled *De lienis et glandularum usu,* Lugd. Bat., 1660. In one of Steno's earlier dissertations, *De glandulis oris et novis inde prodeuntibus salivae vasis,* Lugd. Bat., 1661, he quotes Sylvius' description and adds that conglobate glands characteristically discharge their contents into the blood, while the conglomerates empty into body cavities, such as the eyes, nose, mouth, and intestines. Thus conglobate glands are our lymphatic glands and conglomerate include the pancreas, and the salivary and lacrimal glands. See Maar, *Nicolai Stenonis opera,* I, pp. xiii, 20–21 and 227.

[56] An observation referred to by Thomas Bartholin in his *Anatomy,* p. 81.

[57] A future day has indeed yielded experiments restoring to the liver a large part of its former office. Howell (pp. 843–844) says: "We now know that the digested and resynthesized fats are absorbed by way of the lacteals, but that the other products of digestion are absorbed mainly through the blood-vessels, and therefore enter the portal system and pass through the liver before reaching the general circulation."

[58] According to the Galenic physiology, the liver was the manufactory of the blood, which it also purified by straining out the bile into the gall bladder, while the heart perfected the blood by the addition of "vital spirits."

taken into the intestines the branches of the portal vein touch upon it, both these vessels having communication with the liver. Farewell, most illustrious Sir, and hold in esteem your friend,

Copenhagen, June 12, 1664 (O.S.). NICOLAUS STENO

LITERATURE CITED

ADELMANN, H. B., editor and translator. See COITER, V. and FABRICIUS, H.

ALBERTUS MAGNUS. *De animalibus libri XXVI.* Hrsg. von Hermann Stadler. Münster, 1916–1920. 2 vols. (Beiträge zur Geschichte der Philosophie des Mittelalters, vols. 15–16.)

ALDES, THEODORUS. *Observationes in ovis institutae.* (See LE CLERC, D. and MANGETUS, J., *Bibliotheca anatomica,* vol. 1.)

———. *Sciagraphia nutritionis pulli in ovo.* (*Bibliotheca anatomica,* vol. 1.)

ARISTOTLE. *The works of Aristotle,* translated into English under the editorship of J. A. Smith and W. D. Ross. Oxford, 1908–1931. 11 vols.

BARTHOLINUS, T. *Anatome.* Lugd. Bat., 1686.

BEKKER, I., editor. See PLATO.

BLANCARD, S. *Lexicon novum medicum Graeco-Latinum.* Lugd. Bat., 1690.

BOYLE, R. *Philosophical works.* Edited by Peter Shaw. London, 1725. 3 vols.

BROCK, A. J., editor and translator. See GALEN.

CASTELLUS, B. *Lexicon medicum.* Norimbergae, 1682.

CLERICUS, editor. See ERASMUS.

COITER, V. *Externarum et internarum principalium humani corporis partium tabulae.* Noribergae, 1573. (First edition, 1572.)

———. The "De ovorum gallinaceorum generationis primo exordio progressuque, et pulli gallinacei creationis ordine" of Volcher Coiter. Translated and edited with notes and introduction by H. B. Adelmann. *Ann. med. Hist.,* 1933, *n.s. 5,* 327–341 and 444–457.

COLE, F. J. *Early theories of sexual generation.* Oxford, 1930.

DAREMBERG, C. *Histoire des sciences médicales.* Paris, 1870. 2 vols.

ERASMUS. *Opera omnia.* Edited by Clericus. Leyden, 1703.

FABRICIUS, H. *The embryological treatises of Hieronymus Fabricius of Aquapendente.* A facsimile edition, with an introduction, a translation, and a commentary by H. B. Adelmann. Ithaca, N.Y., 1942.

FABRONIUS, A. *Vitae Italorum doctrina excellentium, qui saeculis* XVII. *et* XVIII. *floruerunt.* Pisis, 1778–1805. Vol. III, 1779. Not seen; cited from MAAR, *Nicolai Stenonis opera philosophica.* Copenhagen, 1910.

FACCIOLATUS, J. *Fasti Gymnasii Patavini.* Patavii, 1757. 2 vols.

FOSTER, *Sir* MICHAEL. *Lectures on the history of physiology during the sixteenth, seventeenth and eighteenth centuries.* Cambridge, 1924.

GALEN. *Opera omnia.* Edited by C. G. Kühn. Lipsiae, 1821–1833. 20 vols.

———. *On the natural faculties,* with an English translation by A. J. Brock. . . . London, New York, 1928. (Loeb Classical Library.)

GOSCH, C. C. A. *Udsigt over Danmarks zoologiske Literatur,* 2 Afdeling, 1 Hefte. Kjøbenhavn, 1872. Not seen; cited from MAAR, *Nicolai Stenonis opera philosophica.* Copenhagen, 1910.

HALLER, A. VON. *Sur la formation du coeur dans le poulet; sur l'oeil; sur la structure du jaune &c.* Premier mémoire. Exposé des faits. Lausanne, 1758.

———. *Sur la formation du coeur dans le poulet; sur l'oeil, sur la structure du jaune, &c.* Second mémoire. Précis des observations; suivi de réflexions sur le developement: avec un mémoire sur plusieurs phénomènes de la respiration. Lausanne, 1758.

HARVEY, W. *Exercitationes de generatione animalium.* Londini, 1651.

———. *The works.* Translated from the Latin, with a life of the author, by Robert Willis. London, 1847.

HIPPOCRATES. *Hippocrates,* with an English translation by W. H. S. Jones. (Vol. 3 tr. by E. T. Withington) London, New York, 1923–1931. 4 vols. (Loeb Classical Library.)

HOWELL, W. H. *A text-book of physiology.* 12th ed. Philadelphia and London, 1933.

JONES, W. H. S., translator. See HIPPOCRATES.

JØRGENSEN, A. D. *Nils Stensen, et Mindeskrift.* Kjøbenhavn, 1884.

KNAKE, E. Über die Bedeutung des Zeitpunktes des Explantation und damit zusammenhängender Umstände (Dotterresorption) für die Wachstumsart des Hühnerpankreas in vitro. *Z. Zellforsch.,* 1935, *22,* 754–770.

KÜHN, C. G., editor. See GALEN.

LE CLERC, D. and MANGETUS, J., editors. *Bibliotheca anatomica.* Genevae, 1685.

LEUTSCH, E. L. A. and SCHNEIDEWIN, F. G., editors. *Corpus Paroemiographorum Graecorum.* Gottingae, 1839. 2 vols.

LILLIE, F. R. *The development of the chick.* New York, 1940.

MAAR, V. Om Opdagelsen af ductus vitello-intestinalis. *Overs. danske Vidensk. Selsk. Forh.,* 1908, *5,* 233–265.

———, editor. See STENO.

MAÎTRE-JAN, A. *Observations sur la formation du poulet.* Paris, 1722.

MALPIGHI, M. *Opera omnia.* Lugd. Bat., 1687.

———. *Dissertatio epistolica de formatione pulli in ovo.* Londini, 1673.

———. *Appendix repetitas auctasque De ovo incubato observationes continens.* Londini, 1675.

MANNI, D. M. *Vita del letteratissimo Monsig. Niccolo Stenone di Danimarca Vescovo di Titopoli e Vicario Apostolico.* Firenze, 1775. Not seen; cited from MAAR, *Nicolai Stenonis opera philosophica,* Copenhagen, 1910.

MECKEL, J. F. *System der vergleichenden Anatomie.* Halle, 1821.

MEISEN, V. Nicolaus Steno. In: *Prominent Danish scientists,* edited by V. Meisen. Copenhagen, 1932.

——— and LARSEN, K., editors. *Stenoniana.* Kjøbenhavn, 1933.

MORE, L. T. *The life and works of The Honourable Robert Boyle.* New York and London, 1944.

NEEDHAM, J. *A history of embryology.* Cambridge, 1934.

NEEDHAM, W. *Disquisitio anatomica de formato foetu.* Londini, 1667.

PLATO. *Platonis dialogi Graece et Latine ex recensione Immanuelis Bekkeri.* Berlin, 1816.

PLENKERS, W. Der Däne Niels Stensen. In: *Stimmen aus Maria Laach.* Katholische Blätter. VII Ergänzungsband, 25–28 Ergänzungsheft. Freiburg im Breisgau, 1884.

PLINY. *Natural history,* with an English translation by H. Rackham. London, Cambridge, Mass., 1938. (Loeb Classical Library.)

RACKHAM, H., translator. See PLINY.

SCHERZ, G. Niels Stensen paa Rejse i Frankrig. *Gads Danske Mag.,* 1942, 361–375.

SCHRADER, J. *Observationes et historiae omnes et singulae e Guiljelmi Harvei libello De generatione animalium excerptae, et in accuratissimum ordinem redactae. Item Wilhelmi Langly De generatione animalium observationes quaedam. Accedunt ovi faecundi singulis ab incubatione diebus factae inspectiones.* Amstelodami, 1674.

SINGER, C. *A short history of science to the nineteenth century.* Oxford, 1941.

STADLER, H., editor. See ALBERTUS MAGNUS.

STENO, N. *Opera philosophica.* Edited by Vilhelm Maar. Copenhagen, 1910. 2 vols.

———. *De musculis et glandulis observationum specimen cum epistolis duabus anatomicis.* Hafniae, 1664.

———. *The Prodromus of Nicolaus Steno's dissertation concerning a solid body enclosed by process of nature within a solid.* Translated by J. G. Winter, with a foreword by William H. Hobbs. New York, 1916. (University of Michigan Studies, Humanistic Series, vol. XI, pt. II.)

VIRCHOW, H. Der Dottersack des Huhnes. *Int. Beitr. wiss. Med.*, 1891, *1*, 223–353.

WICHFELD, J. *Erindringer om den Danske Videnskabsmand Niels Stensen-Nicolaus Steno.* Historisk Tidsskrift, 3 Raekke, 4 Bind. Kjøbenhavn, 1865. Not seen; cited from MAAR, *Nicolai Stenonis opera philosophica.* Copenhagen, 1910.

WILLIS, R., translator. See HARVEY.

WINTER, J. G., translator. See STENO.

WISLOCKI, G. B. Note on the behavior of trypan blue injected into the developing egg of the hen. *Anat. Rec.*, 1921, *21*, 267–274.

An Early Attempt at Medical Reform in England, 1844-1845

ARVEL B. ERICKSON*

ONE phase of reform activity of the Peel ministry from 1841–1846 that has been almost completely ignored was the attempt of the Home Secretary, Sir James Graham, to introduce much-needed reform in the practice of medicine. It is the purpose of this article to explain this attempted reform and to analyse the reasons for its failure.

Concern over the state of public health was not a new thing in the middle decades of the nineteenth century, but the state had done nothing about it because public hygiene was regarded as a private, not a public, matter. As a consequence, typhus fever, cholera, smallpox, and other diseases had taken a frightful toll of human life. What else could have been expected? Cesspools were placed in gardens or in basements of houses; the water supply was inadequate and impure; sewage drained into rivers, wells, and other sources of drinking water; streets were rarely, if ever, cleaned; houses, crowded back to back, lacked water, light, ventilation, and sewage disposal; dung-heaps grew like mushrooms; slaughter-houses were built anywhere that economy or fancy dictated; and the dead were buried in over-crowded cemeteries, the family lot, or under the floors of houses.

Attempts such as the Regulation of Buildings Bill, the Drainage of Buildings Bill, and the Borough Improvement Bill of 1840, and MacKinnon's Health of Towns Bill of 1843, all unsuccessful, were one phase of the effort to solve this problem. To Sir James Graham, the Home Secretary, there was, however, another facet to this problem and that was the practice of medicine. He had long been interested in this subject and had carefully studied the Report of the Select Committee on Medical Education of 1834, had assiduously read the reports of the doctors associated with the Poor Law Authority, and had corresponded with the president of the Royal College of Surgeons and the masters of the Society of Apothecaries.[1] And he kept at this subject so steadfastly that the *London Morning Chronicle* declared in 1845 that he had pursued this "hobby" with "an inde-

* Western Reserve University, Cleveland, Ohio.

[1] *Home Office Papers* (Domestic Book), 43/62, p. 21 *et seq.* He had undoubtedly read the widely circulated pamphlet: *Observations on the present system of medical education with a view to medical reform*, London, 1834.

fatigable perseverance as regards the end, and a pliancy and versatility in his choice of means, the union of which is as admirable as it is real."[2]

It was a subject that needed to be pursued with indefatigable zeal. According to the census of 1841, as reported in the *Westminster Review,* there were in the United Kingdom 1,776 physicians, 19,106 surgeons and apothecaries, and 2,152 medical students, making a grand total of 23,034. Of this total there were 16,435 in England, 2,849 in Scotland, 2,900 in Ireland, 632 in Wales, and 168 in the Islands.[3] But in addition to these practitioners, who had at least the rudiments of a technical education, there were, as Traill puts it, "a group of nondescript persons calling themselves surgeon-apothecaries, men-midwives, cuppers, tooth-drawers, compounders, and dispensers of medicines."[4] This group had gained what little knowledge it possessed by actual practice, had little if any schooling, and "were subject to no controlling body, and were unrecognized by law."[5] To be sure, Parliament had in 1815 passed the Apothecaries Act authorizing the Society of Apothecaries to examine all apothecaries in England and Wales, but the Act did not affect druggists or chemists and exempted the Universities of Oxford and Cambridge, the Royal College of Physicians, and the Royal College of Surgeons from its provisions. In addition, much to the annoyance of the physicians and the surgeons who saw in it the loss of their monopoly in the field, hospitals had begun to establish private medical schools.

To bring order out of chaos in this profession and to establish some uniformity in the education, the theory, and the practice of medicine, Graham introduced into the House, on August 7, 1844, a Medical Reform Bill which he had carefully prepared. In doing so, he pointed out that there were seventeen colleges granting degrees and licenses to practise medicine and that there existed over these colleges no regulatory or controlling agency of any kind; that they had lowered their already meagre standards in competing for students; that some had even been guilty of selling degrees. He did not wish to place restrictions on the private practice of medicine, but he did want to have a law passed stating that no one "should be eligible to fill a medical or surgical office in any public institution unless his qualification had been tested by competent authority."[6] All acts of Parliament relating to medicine and surgery should be swept away and a

[2] *London Morning Chronicle,* July 8, 1845, p. 4. (Hereinafter cited as *Chronicle.*)

[3] *Westminster Rev.,* 1846, *35,* 30.

[4] H. D. Traill, ed., *Social England,* London, 1897, *6,* 64.

[5] *Ibid.*

[6] T. C. Hansard, *Parliamentary debates,* 3d. Ser., *76,* 1898. (Hereinafter cited as *Hansard.*)

uniform centralized system should be established for the United Kingdom.

The central and arresting feature of his scheme was the establishment of a council of health in London responsible to the executive government. "Thus the present anomaly of a number of rival bodies possessing powers capable of being exercised without any responsibility would be abolished,"[7] and instead there would be this council of eighteen members (eleven ex officio members consisting of university professors, surgeons, and physicians, and seven to be appointed by the Crown) which would meet periodically, control all examinations, and regulate and equalize all fees to be paid for licenses to practise medicine. The council was to keep a register, which would be published annually, of all physicians and surgeons licensed to practise. The names of licentiates were to be sent to the council by the various licensing bodies, and the council would divide them into three classes: the vendors of medicine, the surgeons, and the physicians. No one was to be licensed as a vendor who was not at least twenty-one years of age, as a surgeon who was under twenty-five, as a physician who was under twenty-six. Those who had no college training and who wished to practise had to be forty years of age and to pass an examination given by the Royal College of Physicians; those who had both a physician's and a surgeon's license could become general practitioners, i.e., combine the usually separate departments of medicine and surgery.

In addition, the council of health was to be empowered to inspect and to supervise the courses of study in the licensing bodies so as to achieve uniformity in qualifications, requirements, and fees. It could refuse to register any person it thought unfit, and no one whose name was not on the register could hold any medical or surgical office in any public institution, the Army, Navy, or East India Company, or give testimony in a court of law. All persons were to be given one year in which to register.

As soon as Graham had concluded his adroit address, Macaulay arose, praised the whole plan, and assured Graham the support of the University of Edinburgh, the College of Physicians, and the College of Surgeons, to whom the Bill, he said, "would give great satisfaction."[8] Wakley, one of the spokesmen for the general practitioners, on the other hand denounced the Bill on the grounds that the proposed council of health did not adequately represent the general practitioners (those who were neither ex-

[7] *Hansard*, 1899. Lucius, an office bearer in the Royal College of Physicians, states that of these licensing bodies, "no two agree in the course of study prescribed, in the strictness of execution, nor in the amount of privilege conferred." *Remarks on medical reform and on Sir James Graham's medical bill*, London, 1845, p. 7.

[8] *Hansard*, 3d. Ser., 76, 1903–1904.

clusively physicians or surgeons), and promised Graham that almost all 30,000 of them would resolutely oppose the Bill.

Leave to bring in the Bill was given just before the House recessed, and therefore before the next session the members of the medical profession had an opportunity fully to apprise themselves of its provisions. And it soon became apparent that both Macaulay and Wakley had correctly diagnosed the situation. The general practitioners at once opposed the Bill. On August 27, 1844, the general practitioners of London held a meeting in Exeter Hall and unanimously adopted a resolution condemning the Bill *in toto*.[9] In the first place, it was denounced as a "Quack Protection Bill" since it repealed the Apothecaries Act of 1815 and so threw open medical practice to unqualified persons. The *London Medical Gazette,* proud of its record of having labored to maintain the old professional tabernacles in their integrity and of its opposition to change, was particularly critical of the Bill on this score. It argued that quackery ought to be made illegal and "made punishable, upon prosecution, as a high crime and misdemeanor, which it certainly is." This could be done, the *Gazette* recognized, only by making it illegal to advertise patent medicines in newspapers. But such advertisements were a lucrative source of revenue to the papers and therefore Graham would undoubtedly do nothing to stop it. "We should indeed like to see," it wrote, "with what countenance the Right Hon. Baronet could face the editor and Proprietor of the *Cumberland Chronicle,* or the *Carlisle Independent* in the prospect of an election, had he been accessory to cutting off supplies to the amount of several hundreds per annum in the shape of quack advertisements."[10] The comic touch to this argument against the proposed law was supplied by *Punch:*

> And unto quackery ope the door?
> Have Galen's sons offended thee?
> Or love'st thou quacks from sympathy?
> Ah! hold, Sir James, thy ruthless hand,
> Nor meddle with affairs thou dost not understand.[11]

In the second place, they did not like the registration scheme whereby all medical practitioners were to be alphabetically listed as physicians, surgeons, and licentiates in medicine and surgery. "Thus," wrote the *Lancet,* their leading journal and spokesman, "nineteen-twentieths of the medical practitioners of the country will . . . be branded with the mark of *inferiority,* and be classed at the *lowest* figure in the scale of professional qualifi-

[9] See the *London Times,* Aug. 27, 1844, p. 7.
[10] *Lond. med. Gaz.,* 1844, *n.s. 34,* 666–667.
[11] *Punch,* 1844, *8,* 76.

cation and rank." It assumed that the names of physicians would head the list, then would appear the names of the surgeons, and at the bottom would appear the names of the general practitioners, thus marked as "a degraded caste; the lowest order."[12] At the same time, they objected to the registration fees, which were fixed at £5 for physicians and surgeons and at £2 for the general practitioners. "Having already paid handsomely for our diploma, license, or certificate," wrote the *Medical Gazette,* "we peremptorily object to this proposition to pay any more."[13]

Some criticized the Bill as a "job" done by Graham at the behest of the Scottish and Irish physicians and surgeons and hence "un-English."[14] The *Lancet* declared that it was "the dirty work of the *monopolists,*" i.e., the physicians and surgeons of the entire United Kingdom.[15] Others objected to the spirit of centralization and uniformity implicit in the Bill. To them, centralization was synonymous with tyranny and they did not wish the medical profession tyrannized over, as the *Medical Gazette* put it, "by the Secretary of State of the Home Office and his obsequious nominees."[16] The *Quarterly Review,* while praising the other features of the Bill, complained that it did not regulate midwifery together with the other branches of medical practice.[17]

The main opposition, however, was directed against the proposed council of health. As the *Lancet* put it, thirteen of the eighteen members would "derive their seats from the Crown, and the other five will be chosen by the close and corrupt medical corporations. Oh, rare institution."[18] The general practitioners desired a council of health the membership of which was elective rather than appointive. They professed to see a union of the medical profession and the State resulting from Graham's Bill, comparable to that between the Church and State. "Subject the medical government of this country," wrote the *Lancet,* "by means of such [a council], to the control of a minister of the Crown, and the independence of the profession is gone forever."[19] The *London Times,* now violently anti-Graham, incessantly harped on this point. The Bill, it said, would make the Home Secretary virtually a dictator over the medical profession, since all schemes for

[12] Lancet, 1844, *n.s. 2,* 322–323.

[13] *Med. Gaz., 34,* 778. The same criticism was made by the *British and Foreign Medical Review or Quarterly Journal of Practical Medicine and Surgery* (1844, *19,* 202). (Hereinafter cited as *Brit. for. med. Rev.*) The *London and Edinburgh Monthly Journal of Medical Science* (1844, *4,* 843) objected to "our ill-paid and ruined profession [being] taxed to the enormous amount of £75,000."

[14] See *Med. Gaz., 34,* 837.

[15] *Lancet, 2,* 167.

[16] *Med. Gaz., 35,* 293. This was also the chief criticism of the *London Times,* Aug. 31, 1844, p. 4; Sept. 10, 1844, p. 4.

[17] *Quart. Rev.,* 1844, *85,* 17 *et seq.*

[18] *Lancet, 2,* 228.

[19] *Ibid.,* 264.

examinations conducted by the College of Physicians and the College of Surgeons (assisted by the Apothecaries Company) were to be approved by the Home Secretary's council "with its quorum of seven nominees of the Crown, and therefore the ultimate power of nominating all examinees is virtually vested in the Home Secretary."[20] The *Lancet* concluded that "Chadwick and Company" had concocted the scheme of having the council so chosen as to place the medical profession "at the mercy of the poor-law commissioners and the Secretary of State for the Home Department."[21]

To be sure that their interests would be safeguarded, the general practitioners formed, in December, 1844, the National Association of General Practitioners. Early in 1845 this association sent a long letter to Graham protesting against the Bill and asking that they be incorporated by a charter "into an independent college . . . and placed in every respect on a footing of equality with the existing colleges of physicians and surgeons.[22] In addition, numerous meetings were held at which memorials, pleas, and protests were drawn up and sent to Graham. Almost every town in England soon had a "Medical Protective Society" dedicated to the task of defeating the Bill.[23] All of which proved, jibed the *Illustrated News,* that Englishmen "did not like to take their salts from a senna-tor like Sir James."[24]

But Graham's Bill was received with a great deal of praise as well as criticism. The *Edinburgh Medical and Surgical Journal,* chief spokesman for the physicians and surgeons, declared that it was "as perfect as the present state of the profession admits, and remarkably well suited to remove and rectify the abuses and evils of which the members of the profession have long complained."[25] If this Bill did not pass, predicted the *Journal,* a long time would elapse before another would be drawn up. The council of the Medical Association of Ireland drew up a resolution supporting the measure;[26] the usually anti-Graham *Chronicle* grudgingly supported it;[27] and even the *London Medical Gazette,* by October, was apologizing for its earlier opposition.

But the proponents of the measure did more than merely praise the Bill; they replied to each of the objections that had been raised by the opposition. They admitted that Graham's measure did not regulate or abolish

[20] *London Times,* Oct. 8, 1844, p. 4.

[21] *Lancet,* 2, 87.

[22] *Lancet,* 1845, *1,* 135. Graham agreed to accept their request if they themselves drew up a detailed plan and signed it. *Home Office Papers* (Domestic Book), 43/68, p. 224.

[23] A list of these meetings, though not a complete one, is given in *Lancet,* 1845, *1,* 135.

[24] *Illustrated News,* 1844, *6,* 75.

[25] *Edinb. med. surg. J.,* 1844, *63,* 196; *62,* 543.

[26] *Home Office Papers* (Ireland), 122/18, p. 301.

[27] *London Morning Chronicle,* Sept. 10 and 20, 1844. (Hereinafter cited as *Chronicle.*)

quackery, but agreed with Graham that this could not be done. People, when sick, would seek aid from anyone they wished; and, in any event, who was a quack? What was quackery? When the Government had said who was and who was not a regular practitioner, the rest had to be left to the will of the individual. All that could possibly be done, wrote the *Edinburgh Medical and Surgical Journal,* was to prohibit the sale of patent medicines "which have put hundreds silently to death."[28] G. Crook, in a pamphlet entitled *The Proposed Scheme of Medical Reform in Reference to Chemists and Druggists,* declared that it would be impossible to find one person "who could not prescribe some remedy for some disease—many of them for all diseases." This could be stopped only by making it a felony "for any man to take a dose of physic without prescription from a regular practitioner." This, of course, was manifestly impossible and John Bull would strenuously resist such a law as "unconstitutional."[29] With respect to midwifery, proponents of the measure declared that it was right of Graham not to regulate the practice, for if a woman wanted a female instead of a male to deliver her baby she ought to be allowed that privilege. And in 1844, it must be admitted, the majority of midwives were probably as proficient in this art as were most of the medical men.

The physicians and surgeons also regarded the registration scheme as an immense improvement on the old system because it would introduce uniformity and order into a profession where there had been, as the *Chronicle* put it, "no gleam of order, arrangement, or regularity."[30] They did not even bother to answer the charge that the registration fees were too high.

To the criticism that the measure introduced too much centralization and gave to the Home Office despotic power over the profession, the proponents answered that this was one of its best features because it delivered the profession, as the *Medical Times* put it, "from ten or twelve beggarly corporations, who had the power of admitting into our Profession anybody at any price, with any attainments," and that it would end the competition between the "different diploma factories." With respect to the Bill's giving the Home Office despotic power, the same journal declared this to be "simply moonshine," because "no government would have an interest in injuring or degrading the medical profession." Furthermore, the Home Secretary was, after all, responsible to both Parliament and public.[31]

It was also pointed out that centralized control would accomplish a decent standard of education for all medical men with the result that no

[28] *Edinb. med. surg. J., 62,* 544–545.

[29] G. Crook, *The proposed scheme of medical reform in reference to chemists and druggists,* London, 1842, pp. 162–163.

[30] *Chronicle,* Sept. 10, 1844.

[31] *Med. Times, 10,* 388; 429; 518. See also the *Edinb. med. surg. J., 63,* 187.

one in the future would be licensed to practise who could not prove himself qualified to do so.

Finally, supporters of the measure defended the proposed council of health on the grounds that the members chosen by the Government could have no earthly interest in or desire to harm the profession;[32] that since the duties of such a board would be judicial and executive, laymen should serve on it as well as professional men, as was the case with the Admiralty Board. *The British and Foreign Medical Review* even went so far as to suggest that the Home Secretary ought to appoint *all* the members of the council at his own discretion and on his own responsibility.[33] To those medical practitioners who opposed the creation of a regulating government board because they preferred to have the profession govern itself, the *Edinburgh Medical and Surgical Journal* was very critical: "This is . . . what has been going on in this country . . . for the last century, and what is the result: Most complete anarchy, or no government at all; all confusion, disorder and irregularity. The idea of the medical profession governing themselves is completely utopian."[34] And those who objected to the council because it was a nominated rather than elected one, the same journal accused of doing so merely because the representative or elective system had become popular in the political arena, and because it sounded well.[35]

In addition to those who opposed and those who favored the Bill, there were a considerable body who opposed some parts of it and favored others, felt that despite its weaknesses and shortcomings regulation of some kind was necessary, and were therefore willing to accept it.

Because of the contrariety of opinion which his measure had evoked, Graham decided to frame a new Bill which he hoped would be acceptable to all. This Bill, which he presented to the House on February 25, 1845, exempted the Universities of Oxford and Cambridge and hence secured to them all of their customary privileges; permitted the Apothecaries Company to prosecute all unregistered practitioners who practised without a license from their body; made it a penal offense for any person falsely to assume the title of physician, surgeon, apothecary, or doctor; and provided for compulsory examinations for all midwives. The Bill proposed to retain both the registration system as well as the council of health provided for in the first measure, although Graham did not agree to recommend to the Crown the appointment of general practitioners to the council.[36]

But the new Bill was still not palatable to the general practitioners.

[32] *Edinb. med. surg. J., 63,* 187.
[33] *Brit. for. med. Rev., 30,* 220; *Med. Times,* 1844, *10,* 518.
[34] *Edinb. med. surg. J., 63,* 181.
[35] *Ibid.,* 184.
[36] See *Hansard,* 3d. Ser., *77,* 1212–1221.

They admitted that it was a vastly improved one; that it was "a just concession to reason, justice and humanity;"[37] that Graham had sought to conciliate all parties; but that it still gave too much power to the Home Secretary and so destroyed the independence of the profession. Furthermore, they objected to the registration system, which created, according to the *Lancet,* "an aristocracy amongst the medical practitioners."[38]

The physicians and surgeons, since they lost none of their vested rights, continued to support the measure. In a pamphlet entitled, *Observations on the Education and Examination for Degrees in Medicine as Affected by the New Medical Bill,* Richard Quain defended the registration system on the grounds that it would serve to encourage the general practitioners "to labour for the acquisition of additional honours" such as the title of "Doctor of Medicine."[39] Lucius, another pamphleteer, defended the council of health declaring that it was "impossible to conceive a Board better calculated by its constitution to answer the purposes for which it is intended."[40]

The reaction of the press was equally contradictory. The *London Globe* opposed the whole scheme because it did not specifically abolish quackery.[41] The *Chronicle* mildly approved the Bill because it provided for examinations for midwifery.[42] The *Illustrated News* supported the measure because it protected the profession from "false pretenders" and the public from uneducated practitioners.[43] The *Edinburgh Review* was loud in its praises, stating that "the thanks of the medical profession, as well as the country at large, are due to him [Graham] for the address and success with which he has reconciled conflicting interests."[44]

But the conflicting interests had not been reconciled, and Graham knew it. To achieve that goal he agreed to meet with a deputation from the Medical Protective Assembly. The latter at once asked Graham that they be allowed to form a college of their own to be known as "The Royal College of General Practitioners in Medicine, Surgery and Midwifery." Graham agreed on the following conditions:

1. That the general practitioners agree unequivocally to accept such a charter if granted,[45]
2. That the college have two representatives on the council of health,
3. That the course of education to be established be subject to the approval of the council of health,

[37] *Lancet,* I, 241. See also *Med. Gaz., 35,* 717.
[38] *Ibid.,* I, 296.
[39] Richard Quain, *Observations on the education and examination for degrees in medicine as affected by the new medical bill,* London, 1845, p. 56.
[40] Lucius, *op. cit.* (Note 8), 13.
[41] *London Globe,* April 3, 1845, p. 2.
[42] *Chronicle,* Feb. 26, 1845, p. 5.
[43] *Illustrated News, 6,* 129.
[44] *Edinb. Rev., 81,* 271–272.
[45] *Home Office Papers* (Domestic Book), 43/69, p. 167.

4. That everyone, physicians, surgeons, and general practitioners must submit to a general examination given by the board of physicians and surgeons. Those who passed it and wished to be physicians must be twenty-six years of age and pass an examination given by the College of Physicians before they could register as physicians; those wishing to be surgeons had to be twenty-six and pass an examination given by the College of Surgeons; those wanting to be general practitioners had to be twenty-two and pass an examination given by their college,
5. That all colleges require five years of study,
6. That the penal clauses of the Apothecaries Act be retained.[46]

The deputation agreed to these terms. On May 7, 1845, Graham asked leave to recommit the Bill incorporating the new terms. If it did not then pass, he said, "I confess I shall absolutely despair."[47]

During the debates on the recommitted Bill, Graham made three more alterations in it. First, instead of an examination before a joint board of physicians and surgeons, the general examination should be given by a board of general practitioners to be followed by one given by the joint board. Those who passed both were to be recognized as general practitioners and to be members of the College of Surgeons. Secondly, one who moved from one part of the Kingdom to another should be admitted to the corresponding college there. Finally, the council of health was to be cut to thirteen members.[48]

These changes, which, in the opinion of the *Times,* were so great that the Bill now "bore no resemblance to the original,"[49] and which made the Bill "extremely satisfactory," in the opinion of the *Chronicle,*[50] did not make it acceptable to the profession at large. The general practitioners still did not like it because the membership of the council of health was to consist of one secretary of state and twelve others appointed by the Crown. As a consequence, said the *Lancet,* "the leaden weight of patronage and courtly sycophancy will exercise its pernicious effect."[51] Furthermore, they still objected to the "degraded position" assigned them in the registration list. Graham, on the other hand, would not change the registration plan nor "consent to give up in any point the principle of Nomination by the Crown as it now appears in the Bill."[52]

[46] *Three reports by the joint deputation of the Society of Apothecaries and the National Association of General Practitioners appointed to confer with the Secretary of State,* Report I, 10–14. At the same time he continued to refuse to grant a charter to the Apothecaries Society or to appoint any of that group to the council of health. *Home Office Papers* (Domestic Book), 43/69, pp. 66–70; 165–166.

[47] *Hansard,* 3d. Ser., *80,* 257.

[48] *Ibid., 82,* 1169–1170.

[49] *London Times,* July 28, 1845, p. 4.

[50] *Chronicle,* June 9, 1845, p. 4.

[51] *Lancet, 2,* 185.

[52] *Home Office Papers* (Domestic Book), 43/68, p. 340.

And now the physicians and surgeons, "incurably obstinate in their resolve to live on at all hazards as private clubs," as the *Chronicle* stated it, joined in opposition to the Bill. In the first instance, they objected to the creation of a college of general practitioners, for, according to the *Edinburgh Medical and Surgical Journal,* "99 in 100 of the general practitioners are most imperfectly educated, all engaged in the trading, money-making parts of the profession, and not one in 100 of them distinguished by anything like science or liberality of mind."[53] The physicians objected to being forced to take an examination given by general practitioners and to the permission given to that group to fill all medical and surgical offices, because the latter were not only the youngest (twenty-two years of age), but also the least educated of all medical men. The surgeons protested against the new college's being made "coordinate in professional rank and importance with the existing Colleges of Physicians and Surgeons,"[54] as well as to the clause by which general practitioners were deemed capable of practising surgery.

Completely discouraged as well as disgusted with the reception accorded his efforts at reform, Graham gave up the struggle and dropped his reform Bill with the announcement that he would not again introduce a bill on the subject unless there was "a reasonable probability of its giving satisfaction to the Profession generally," and that he did not then "entertain any such expectation."[55]

And so the first major effort at reform in the medical field ended in failure. It failed partly because the physicians and surgeons, who already had all they wanted or could get, had nothing to gain by the proposed reform and did not want to weaken their favored position by acceding to the general practitioner's demands for equality.[56] Corporations like these are inherently selfish and automatically oppose any changes which they think will alter their position. The masses, for their part, were completely apathetic since they knew little about the subject and cared less. It was not a type of reform in which public support could be used to break down the indifference of legislators and the opposition of vested interests. Furthermore, the profession as a whole really did not want reform, objected to government interference, and insisted that when reform was needed it should come from the profession itself—be planned and executed by medical men. Finally, the medical profession, like other groups and "interests," was op-

[53] *Edinb. med. surg. J., 64,* 255.

[54] *Three reports by the joint deputation of Apothecaries and the National Association of General Practitioners,* Report II, 18.

[55] *Home Office Papers* (Domestic Book), 43/70, pp. 360–361.

[56] See *Med. Times, 13,* 282, and the *Med.-Chir. Rev.,* 1845, *n.s. 4,* 239–240.

posed to increasing the power and authority of the central government. It preferred local health boards,[87] which they could more easily control, to a national council of health.

At the same time, however, the discussions on Graham's proposed reform measure helped to stimulate the interest in public health which bore fruit in the Public Health Act of 1848. It was the model used by the framers of the Medical Act of 1858 which, while much less mandatory and restrictive than Graham's measure, did provide for both a medical council and a system of registration for properly qualified practitioners as Graham's measure had done. Furthermore, Graham's labors helped to stimulate interest in the development of a proper relationship of medicine to society. And, while it is impossible to point out any definite causal relationships between developments in England and in other lands, it is interesting to note that during these same years a like development was taking place in the United States, France, Germany, and the Scandinavian countries.

In a larger sense, therefore, Graham's efforts to secure reform in the medical field were not unsuccessful, for while his own reform bill was not adopted, the discussions on the bill and the public interest which it created did lead to the passage of the Public Health Act of 1848 and the Medical Act of 1858, and was an important link in the chain of developments which ultimately culminated in the Charter of Social Security of 1948.

Acknowledgment

The author wishes to acknowledge with thanks the permission granted him in 1947 by Sir Fergus Graham to use the Graham Papers at Netherby, Cumberland, and by the Royal College of Surgeons in London to use the excellent periodical collection in their library.

[87] See the article, "The medical policy of the United Kingdom," in *Edinb. Rev., 45,* 29–46.

Notes on Renaissance Artists and Practical Anatomy

CHARLES SINGER*

IT needs no deep analysis to see anatomical implications in the new treatment of the human body that began in the fifteenth century among Italian artists. Interest in the body itself is a normal part of 'humanism,' the signatory bar of which is the phrase of Protagoras "Man the measure of all things." The masterpieces of Renaissance art were thus necessarily based on human anatomy. But the artists have not told us of their ways of working, for knowledge of the structure of the body was for them but a means to an end. Few have been those artists for whom anatomy passed into disinterested study of the subject for its own sake. For this and other reasons it is impossible to reduce to a coherent narrative the record of the debt of art to anatomy. We can, however, discern about a score of typical artists of the later fifteenth and earlier sixteenth centuries who had dipped more or less deeply into the practical study of anatomy by dissection. Further study would doubtless reveal many more. I put down these rough notes as they may form a useful preliminary framework for a more complete investigation of the subject by someone better informed than I.

1. Of the artists known to me in whom anatomical contacts are demonstrable, the senior is probably *Antonio Pollaiuolo* (1432–1498). His passion was to display the rules of movement in the human frame. "He understood the nude in a more modern way than the masters before him," says Vasari "and he removed the skin from many corpses to see the anatomy beneath." He was the greatest anatomical student among the artists before Leonardo. One of his most characteristic pictures is his *Martyrdom of St. Sebastian* of 1475 now in the National Gallery in London. Its composition, as well as that of the bas-relief of two naked struggling figures at South Kensington Museum, shows evidence of exact anatomical study. His anatomical knowledge is revealed best perhaps in the magnificent *Battle of the Ten Nudes* which is the subject of the only engraving that he is known to have made.

2. *Andrea di Michele di Francesco,* named *Verrocchio* (1435–1488) after his earliest master, studied with Pollaiuolo under Donatello. All three worked in Florence where Verrocchio taught Leonardo da Vinci. He had a

* Par, Cornwall, England.

strong scientific bias. He did not portray many nudes but one of the figures in the silver relief of the *Decollation of the Baptist* in the Museo del Duomo at Florence shows accurate anatomical knowledge. Few drawings can be safely ascribed to him, but at Christ Church, Oxford, are three sketches which definitely establish him as a practical anatomist. They represent the surface muscles in bodies from which the skin has been removed. Many details in them could have been ascertained only from actual dissection. The same may be said of his lively bronze *David* in the Museo Nazionale at Florence. Vasari tells how, by his knowledge of anatomy, Verrocchio was able to restore the limbs of an ancient torso of the flayed Marsyas.

3. *Andrea Mantegna* (1431–1506) spent many years at Padua. There he attained proficiency as a painter at an astonishingly early age. Paduan scholarship left its mark on him for he was taken into the house of Squarcione (1394–1474), a philanthropist who spent his wealth on the classical education of promising youths. Mantegna became very learned in classical art. Ancient models deeply affected his style. Evidence that he studied anatomy is less convincing for him than for most of the artists whom we discuss. One of his latest works is his *Dead Christ* in the Brera Gallery at Milan. It is an extremely skilful and highly scientific study in perspective of a corpse seen from an unusual point of view. In its own genre it is without rival.

4. It has been suggested, with very little justification, that Mantegna was the artist of the Italian *Fasciculo di Medicina* of 1493 which includes a magnificent dissection scene. Its draughtsman was also perhaps the illustrator of Colonna's famous *Hypnerotomachia.* The draughtsman of the *Fasciculo* had certainly examined internal organs and had been present at dissections.

5. *Luca Signorelli* (1442–1524) was a most active painter deeply influenced by his teacher Pollaiuolo. From an early age he paid great attention to anatomy. He habitually visited burial grounds to obtain parts of bodies. Of all the artists of this time his nudes—which are not numerous—are most closely dependent on anatomical knowledge. His method deeply influenced Michelangelo who admired him greatly. Perhaps his best display of anatomical knowledge is in the great canvas *Pan* in the Berlin Gallery which was painted for Lorenzo dei Medici. It is interesting as a study of several different physical types of different ages and both sexes, unrestrained by any sacred tradition. An important study of the nude is also his *Flagellation* in the Brera Gallery at Milan.

6. It is unnecessary to discuss in detail here the anatomical investiga-

tions of *Leonardo da Vinci* (1452–1519). He gave an immense amount of time and energy to them. At Florence and Milan where he worked there were no universities and thus no public anatomies. This was an advantage to him since his dissections could be performed in private, as were those of his Florentine contemporary Benivieni, the earliest modern morbid anatomist. Leonardo anatomised more than thirty bodies for the drawings in his notebooks. He was the first of his age to invoke mechanical principles to explain the action of muscles, bones, tendons, and ligaments. He had projected a work on the action of these structures to be prefaced with a treatise on the elements of mechanics.

There has been much discussion as to whether Leonardo influenced later anatomists. It has not been shown that his anatomical drawings were either copied or imitated, but a recognised teacher of art could hardly dissect thirty bodies entirely in secret. Without discussing his association with Marco Antonio della Torre, we must recognise that Leonardo's work does suggest some contact with other anatomists, so that it is reasonable to suppose that other anatomists learned something from him. Leonardo was specially active in anatomical work between 1489 and 1513. During precisely this period the anatomical outlook in Italy turned from its medieval phase. The illustrations of the book of Berengario of 1522 (see no. 12) are not copied from Leonardo but they are among the first attempts to employ the new art in the service of dissectional anatomy. In that sense Berengario's artist was the heir of Leonardo.

7. *Albrecht Dürer* (1471–1528), though born at Nuremberg, came of a family of Hungarian origin. So far as our theme is concerned he was essentially a child of the Italian Renaissance. He spent several of his most fruitful years in Italy where he acquired the principles of perspective and developed his general attitude toward science. He followed Leonardo and other Italian painters of the day in his interest in the canon of proportion of the human body. His studies in this direction began at least as early as 1512 and culminated in his great *De symmetria partium in rectis formis humanorum corporum* of 1528 which appeared in at least fourteen editions and translations. It is concerned not only with the canon of proportion in the two sexes but treats also, in a truly scientific manner, of the natural changes of proportion of the parts from infancy to age and with the difference of proportion in divers types of physique. At some part of his career Dürer was actually occupied with anatomisation. Several of his sketches of dissected parts have survived.

8. Many of the nudes of *Michelangelo* (1475–1564) portray a kind of

knowledge of underlying structures that could be attained and guided only by dissection. Vasari states that during twelve years he pursued anatomical research enthusiastically. He worked at anatomy first at Florence, where he had a regular dissecting room in the hospital of San Spirito, and afterwards at Rome. He was intimate with the anatomist Realdo Colombo (1516–1559), a successor to Vesalius. He was especially interested, says Vasari, in the action and form of the muscles and tendons, and their relations to the skeleton in producing the various bodily movements. Many of his greatest works attest the knowledge thus acquired. There survive also certain sketches by him which display actual dissectional details.

9. *Titian* (1477–1576) is said to have added careful and prolonged anatomical study to his unparalleled activity as a painter. Despite the exactness of his nudes it cannot be said that they clearly reveal details which could be ascertained only by dissection. A practised anatomist might well have something to say on this matter concerning his *St. Sebastian* in San Nazaro e Celio at Brescia. As all know, the figures in the *Fabrica* and *Epitome* have been ascribed to Titian. The evidence seems to me to be of little value and from all we know of the man, it seems to me unlikely that anatomy would deeply interest him. Few of his sketches have any real anatomical bearing. In the Academy at Venice there is, however, a drawing of a skeleton ascribed to him. It is in a dramatic posture and its outline is well and firmly rendered by an accomplished artist. Nevertheless, it contains many elementary anatomical errors. Thus, for example, the sternum is wrongly represented though with errors quite different from those of Calcar's treatment of the bone in the *Tabulae sex.*

10. That *Raphael* (1483–1520) had made some study of anatomy we have good evidence, though but little as to his methods. Well known is his study of the *Fainting Virgin* for a picture of the Entombment at the École des Beaux Arts at Paris. In this figure the parts of the skeleton are represented as having collapsed under the weight of the body which is supported by a standing figure. That this skeleton is from nature is attested by its being male and not female. Raphael's object was to portray the bony mechanism of the body during muscular collapse, the sex being irrelevant for his particular purpose. Vasari says that Raphael "examined attentively the articulations of the bones and the attachments of the tendons . . . but he recognized that he could not attain the anatomical perfection of Michelangelo." Nevertheless, many of his drawings show that he had given a considerable attention to the study of écorchés.

11. *Bartolomeo Bandinelli* (1493–1560) of Florence, pupil of Rustici,

the friend of Leonardo da Vinci, was an able sculptor. Some regarded him as a rival of Michelangelo of whom, as of Cellini, he was inordinately jealous. His style bore some resemblance to that of Michelangelo, notably in its over-emphasis of the surface marking of muscles. There can be no doubt of Bandinelli's anatomical knowledge, and Vasari says that he studied anatomy very closely. There are several authenticated sketches by him of écorchés. A contemporary engraving by Marco Dente da Ravenna of a work by him represents a cemetery with skeletons and emaciated bodies rising from their graves. Vasari says that a pupil of Bandinelli, one Agostino Veneziano, engraved a plate by him designed to display various anatomical details.

12. We must include here one at least of the artists of Berengario's *Isagoge breves* of 1522 and 1523. This was the first anatomical textbook that was illustrated in our modern sense. The representations of internal organs are on a low technical level, certain other of the figures are skilfully drawn from the life, yet others are able studies of écorchés. The figure illustrating the oblique abdominal muscles is very dramatic and has undoubted beauty; that of the pregnant woman is a fine study of *deliquium animæ;* several of the écorchés are by one familiar with corresponding representations by the great artists. This work is thus the first to bring the art tradition of its day to the service of anatomical science. As regards illustration it is a not wholly unworthy successor of the *Fasciculo di Medicina* of 1493, nor an entirely negligible predecessor of the *Fabrica* of Vesalius. Could the artist have been Rosso de Rossi?

13. *Rosso de Rossi* (1496–1541) was born at Florence, was a pupil of Andrea del Sarto, and died by his own hand at Fontainebleau where he had been brought by Francis I. To him have been ascribed some of the figures in Charles Estienne's work on anatomy. That book, though not published till 1545, when de Rossi had been four years in his grave, was in preparation as early as 1530. Vasari states that de Rossi had completed a treatise on anatomy before he left Italy in 1530. This never appeared, but Vasari possessed several of de Rossi's sketches. One of his drawings was engraved by de Rossi's pupil Dominico Barbieri (1506–1560) who worked with him at Fontainbleau. It represents two skeletons and two écorchés, each shown from front and back. From it we should guess that the lost anatomical work was for artists.

14. *The master of the initials M. F.* These letters, together with the date 1536, are attached to a fine engraving of Apollo flaying Marsyas. Not only is the body of Marsyas a careful anatomical study, especially for the region of

the neck, but Apollo and the figures that crowd around are all represented with great anatomical detail. (Doubts have been expressed as to the genuineness of the date on this rare work, a copy of which is or was in the Kaiser Friedrich Haus in Berlin.)

15. *Girolamo da Carpi* (1501–1556) of Ferrara illustrated the work on the muscles of the arm by Canano. Artistically this work has perhaps been overpraised, even when allowance is made for the wretched state of the paper on which it was printed. Da Carpi was mainly an imitative painter. His best work shows undoubted merit but betrays no sign of special anatomical knowledge. There is no reason to connect him with the anatomist Giacopo Berengario da Carpi.

16. *Jan Stephan van Calcar* (1499–1546) owes the name by which he is remembered to a townlet near Cleves. He had his first training as a painter at Bruges. In 1536, being thirty-seven years old, he came to Venice to study under Titian. Vasari expresses admiration for his powers, telling that his work was often mistaken for that of his master. The only anatomical drawings certainly by Calcar are the three skeletons of the *Tabulae Sex*. They cannot be claimed as remarkable either for beauty or accuracy. The poses of all have absurd elements. It is true that no drawings of complete skeletons of earlier date surpass Calcar's for detail, yet many bones had been better rendered by previous artists. Calcar's skeletons contain numerous obvious errors. No one has suggested that any other known work of Calcar exhibits anatomical knowledge, but I shall not discuss here again the question of his share, if any, in the *Fabrica* of Vesalius.

17. The artist or artists of the *Fabrica* and *Epitome* of Vesalius should certainly be mentioned here, but it is not the place to discuss them.

18. *Benvenuto Cellini* (1500–1571) was a close friend of the anatomist *Guido Guidi* (Vidus Vidius, died 1569). Cellini says that Guido dwelt in a room in his house at Paris and that, thus living together, they shared interests and work. He adds that a printer in his service set up a book by Guido. The anatomical work of Guido did not appear till 1611. Cellini was also friendly with Berengario da Carpi and it may be that his influence is reflected in the fine nudes in Berengario's work.

19. *Giulio Bonasone* was working as artist and engraver at Bologna about the time Vesalius was printing the *Fabrica* (1542). Bonasone's anatomical work is peculiarly interesting for us since it was evidently made without assistance from anatomists and without any knowledge of anatomical tradition. It thus contrasts with that of most of the artists whom we have discussed. Bonasone was a good draftsman and his figures are lively and con-

vincing. They show certain surface markings suggested by superficial dissection, notably in the region of the thigh. When Bonasone comes to deeper anatomical features his work is extremely poor, nor does his superficial knowledge extend to all parts of the body. Thus he exhibits the anatomical helplessness of an undirected and untutored artist to whom anatomy is a mere accident, the details of which are suggested rather by other artists than by anatomists.

20. *Barrocci* (1528–1612) of Urbino was in his youth associated with Michelangelo at Rome. He was a close student of the styles of the great artists and was more imitative than creative. Certain of his sketches of models in unusual postures prove that he had studied écorchés.

Adam Kuhn: Eighteenth Century Physician and Teacher

MARION E. BROWN*

THE curiosity concerning the life and teachings of Dr. Adam Kuhn, which caused the investigation upon which this paper is based, arose from a statement about Dr. Kuhn in Smallwood's *Natural History and the American Mind*[1] and in a footnote to the edition of Benjamin Rush's *Autobiography*[2] by G. W. Corner, to the effect that little is known about Dr. Kuhn's teachings. Since there was in existence among the manuscript papers of his pupil, Solomon Drowne, a set of notes on lectures given by him in the College of Philadelphia, there was a possibility that something might be learned about the work of this first professor of botany in America. Then it became apparent that other and more complete sets of notes were also in existence and that a comparison of them should provide a reasonably accurate account of Dr. Kuhn's teachings. These proved to be very much what might be expected from his education and experience.

Adam Kuhn was born in 1741 at Germantown, Pennsylvania, the son of Adam Simon Kuhn who had left the small German village of Farfeld near Heilbronn to come to Philadelphia in 1733. Adam Simon Kuhn had had a good education and was apparently a man of considerable ability. He had a sizable medical practice, was a magistrate of the borough of Lancaster, an elder of the Lutheran church, and the only man to be actively concerned about the promotion of learning in that place. The young Adam Kuhn began his medical studies with his father but in the autumn of 1761 went abroad to continue them. Until the summer of 1764, he studied at the University of Upsala and here he fell under the influence of Linnaeus. Linnaeus wrote of him to his father in February 1762:

> About three weeks ago your son, of great promise, and endowed with most engaging manners, arrived here; who after so long a voyage has reached this academy in safety and good health. He will receive from me the most disinterested advice; I will cherish him with paternal affection, and will at no time omit any thing that can contribute to his assistance or advancement, as long as he may choose to avail himself of my counsels.
>
> At this academy he can learn the History and Diagnosis of Diseases, Materia

* Providence, Rhode Island.

[1] Smallwood, W. M. *Natural history and the American mind*. New York, Columbia University Press, 1941. p. 324.

[2] Rush, Benjamin. *Autobiography* . . . ed. by G. W. Corner. Princeton University Press, 1948. p. 94.

Medica and Natural History, better and more thoroughly than perhaps in any other place. And if I should live for three years more, he will be a Doctor of Medicine, not only in name, but also in knowledge.[3]

A year later Linnaeus wrote further:

You recommended your son to my care, concerning whom I am now able to speak with more certainty. He lives in a house next door to me, so that I can daily enjoy his conversation, and inspect his morals and studies. His mind is always aspiring, and his very amiable disposition gives general satisfaction; so that he is beloved and esteemed by us all. He is unwearied in his studies in every branch of medicine, nor does he suffer a single hour to pass by unimproved. He long since began to taste the sweets of science. He daily and faithfully studies Materia Medica with me. He has learnt the symptomatic history of diseases in an accurate and solid manner. In Natural History and Botany he has made remarkable progress, such indeed as he will never repent; so that, God willing, he will hereafter see his country with different eyes than when he left it. He has studied Anatomy and Physiology with other professors. Next summer, during the vacation, he can go to the country, to a farm of mine very near the city, where he may make daily progress in the studies he has commenced. I have been surprised that he has never been afflicted with homesickness; the only thing that has caused him uneasiness, was not receiving any letters from the best of fathers.

You have ventured to send your beloved son to a foreign country; should it be his fate to return to you, I will engage that you will never repent what you have done. In a word, he lives in the most temperate and correct manner. He observes good order in the management of his affairs; nor have any of the allurements of youth, which are apt to ensnare young men, made any impression on him. Therefore I congratulate both you and myself on this your son; and I declare most sacredly that I have never known any one more correct in deportment or superior in application. For the truth of this I pledge my honor.[4]

Apparently Adam Kuhn was one of the small group of students who spent the summer in the country with Linnaeus as suggested in this letter, for Johann Christian Fabricius records that "in Summer we followed him (i.e., Linnaeus) into the country, we three, Kuhn, Zoega and I, all foreigners. In winter we lived directly facing his house, and he came to us every day."[5]

In the summer or autumn of 1764, Kuhn went to London and on October 8th Linnaeus wrote to him that

I this day received your letter, and rejoice exceedingly that the All Gracious God has conducted you in safety to England; and I hope that He also will grant you a safe return to your friends. My whole family was extremely glad to learn that you were well, and desire to be affectionately remembered to you.[6]

In London Adam Kuhn became acquainted with John Ellis, friend and correspondent of Linnaeus, and Ellis in a letter to Linnaeus on January 1,

[3] Thacher, James. *American medical biography:* or, *Memoirs of eminent physicians who have flourished in America* . . . Boston, Richardson & Lord, 1823. 2 vols. in 1. Vol. 2, p. 226.

[4] *Ibid.*, pp. 226–227.

[5] Stoever, D. H. *Life of Sir Charles Linnaeus* . . . tr. by Joseph Trapp. London, for B. and J. White, 1794. pp. 273–274.

[6] Thacher, vol. 2, p. 227.

1765 referred to Kuhn as "your disciple, and my very good friend." The regard in which Linnaeus held Kuhn is shown again in his letter to Ellis six weeks later:

> It gives me much pleasure to perceive, by your last, that Mr. Kuhn is still in London. . . . Kuhn is one of the most worthy and industrious young men I ever knew. Give my kindest regards to him, and ask him to let me hear what country he means to visit after quitting London. Is he about returning home?[7]

In August, Kuhn was still in London, for Ellis wrote that "poor Kuhn has been very ill of a Pleuritic fever, but is now crawling about";[8] however, on October 29th he announced that "our friend Adam Kuhn is now at Mr. Pitcairn's, a merchant's in Edinburgh, Scotland; I do not doubt but he will promote the study of Natural History there."[9] There is no evidence of his having done so and there is, on the other hand, considerable evidence of the influence of the Edinburgh medical school on him.

Good relations between Kuhn and Ellis suffered a setback during the next few years, apparently due in part to the political differences between Great Britain and the American colonies. In December 1770, Ellis wrote bitterly to Linnaeus that

> Dr. Kuhn is one of those American chiefs that despise us Englishmen. I sent him some seeds of the *Rheum palmatum* by a friend, and he had not the decency to thank me; but his German pride will do him no service; for, thank God, we shall now humble those American revolters; He is, to my knowledge, infinitely obliged to you; without your care in cultivating his mind he would have been a mere savage.[10]

Adam Kuhn remained in Edinburgh until 1767, studying with Dr. Cullen and the elder Monro and taking his Doctor of Medicine degree in June 1767. His thesis, *De Lavatione Frigida,* is his only published work and he dedicated it to Linnaeus. In a letter of February 20, 1767, Linnaeus wrote to Kuhn:

> I have learnt from your letter, that you are about to produce the first proof of your acquirements, in an essay on the Power and Efficiency of the Cold Bath on the Human Body; I therefore cannot refrain from heartily congratulating you on this little work, since I shall ever regard what occurs favorable and fortunately for you, in the same light as if it had happened to myself; for, from the period in which, having set sail from the shores of your favored Pennsylvania, you reached our city of Upsal, I have ever cherished you as a beloved son, for your correct and engaging deportment, in which none of the foreigners excelled you; for your unwearied ardor and application in cultivating the sciences, in which you were surpassed by no one; for your undisguised friendship, in which none could have equalled you. Nothing will be more

[7] Smith, J. E. *A selection of the correspondence of Linnaeus and other naturalists, from the original manuscripts* . . . London, Longman, Hurst, Rees, Orme, and Brown, 1821. Vol. 1, p. 165.

[8] *Ibid.*, p. 173.

[9] *Ibid.*, p. 181.

[10] *Ibid.*, p. 256.

ardently desired by me than that, being speedily restored to your friends, you may long prosperously flourish and collect the wonderful treasures of your country; where I may hope to see, with your eyes, a most beautiful region . . . I beg that, when on your return your eyes are feasting on the delights of your flowers, you may still remember me.[11]

Upon his return to Philadelphia in January 1768, Adam Kuhn was immediately appointed professor of materia medica and botany in the College of Philadelphia. According to the record of his election

Dr. Adam Kuhn having made application to be appointed Professor of Botany and Materia Medica in this College, declaring that he would do the utmost in his power to merit the honor, and the trustees having ample assurance of his abilities to fill that Professorship, for which he is likewise particularly recommended by the Medical Trustees and Professors belonging to the College itself, did therefore unanimously appoint him, the said Dr. Kuhn, Professor of Botany and Materia Medica in this College, agreeable to his request.[12]

Thus he became the first professor of botany in that part of America that is now the United States. Apparently his first lecture was given in May, since the *Pennsylvania Gazette* of May 5th announced that

Dr. Kuhn's introductory Lecture to his course of Botany will be delivered on Wednesday, the Eleventh Instant, at Six o'Clock in the Evening, at his House in Market-Street. He will then also give a plan of his Course, and fix the Days of Attendance. . . . Every Gentleman to pay Half a Johannes for the course.

A similar course was announced on May 1st the following year but then it seems to have been dropped. However, he continued to hold the chair of materia medica until 1789 when he was appointed professor of the theory and practice of medicine in the University of Pennsylvania. When the medical schools of the College of Philadelphia and the University of Pennsylvania were joined, he was chosen professor of physic, a position he continued to hold until 1797 when he resigned.

In addition, Dr. Kuhn seems to have maintained a large private practice and carried on various other medical activities. He was one of the physicians chosen by the short-lived Society for Inoculating the Poor with the Smallpox, instituted in 1774; he was twice elected to the medical staff of Pennsylvania Hospital, serving from 1774 to 1781 and from 1782 to 1798 when he resigned; he was appointed one of the consulting surgeons by the Philadelphia Dispensary for the medical relief of the poor when it was founded in 1786; he was an active member in the College of Physicians of Philadelphia and succeeded William Shippen as president in 1808; he was a member of the American Philosophical Society, and an honorary member of the Massachusetts Medical Society.

[11] Thacher, vol. 2, pp. 228–229.

[12] Minutes of the trustees of the College of Philadelphia, January 26, 1768.

An account of Dr. Kuhn's character and habits is preserved in the *Autobiography* of Charles Caldwell, one of his students.

Whether he was regarded mentally or corporeally, in his person, movement, manners, dress, or address, or in the conceptions, habits, and general action and condition of his mind, can any being, in the figure of man, more rigidly, stately, and formal than he was, present itself to the most inventive and fertile imagination. He was, by far, the most highly and minutely furnished specimen of old-school medical production I have ever beheld. . . .

His hair, unusually coarse and strong, of which nature had furnished him with an exuberant abundance, and given to it so firm and permanent a setting, that, at the age of seventy-five, he possessed perhaps, as much of it as he did at that of twenty-five; that appendage of his head his hair-dresser so arranged as to give it the resemblance of a fashionable wig, well pomatumed, stiffly curled, and richly powdered. His hand and bosom-ruffles were full and flowing, his breeches were black, his long-skirted waistcoat white or buff, and his coat snuff-colored. In his hand he carried a gold-headed cane, in his waistcoat pocket a gold snuff-box, and his knee and shoe-buckles were of the same metal. When moving from house to house, in his professional business, so sternly and stubbornly regular were his steps, in both extent and repetition, that he could scarcely be induced to quicken or lengthen them, either to escape from a thunder-gust or a hailstorm, to relieve colic, to arrest a hemorrhage, or scarcely to save the life of the most meritorious of his patients.[13]

Both his private and professional life were of "unsurpassed regularity and order."[14] His hours of arising and retiring were precise, his hours of professional calls equally so. Again according to Caldwell:

He entered each sick-room at a given time, spent a given number of minutes in examining and prescribing and never suffered the slightest deviation to be made from his directions. Weak sage tea was a favorite beverage, which he often prescribed as a drink for the sick. If, as was sometimes the case, the kind nurse or attendant took the liberty of saying to him, as he was moving toward the door, to make his exit from the room: "Doctor, should the patient want to drink a little toast-water, or lemonade, I suppose I may give it to him?" he would turn and reply, with oracular solemnity and decisiveness: "I have directed, or I have said, weak sage tea. Good morning, Madam." . . . This decisiveness . . . was characterized by sound judgment and the dictate of experience.[15]

Caldwell's comments on Dr. Kuhn's abilities and teachings are also interesting. According to him, he was "a scholar, had a respectable acquaintance with the several branches of natural science most nearly allied to medicine, and did not . . . commence his professional studies with his mind deplorably crude, uninformed, and undisciplined."[16] His lectures, although their content was

neither inappropriate nor uninstructive, their style, manner, and delivery were mere commonplace. So far was the address, moreover, from containing an original thought,

[13] Caldwell, Charles. *Autobiography*, ed. by H. W. Warner. Philadelphia, Lippincott, 1855. pp. 121–122.

[14] *Ibid.*, p. 122.

[15] *Ibid.*, pp. 122–123.

[16] *Ibid.*, p. 121.

that no portion of it appeared to be even the professor's own. From beginning to end, it was in substance but a transcript from the writings of Cullen. It was therefore no unsuitable preface to the Doctor's course of lectures, all of which were strikingly characterized by the doctrines and notions of Cullen, and not a few of them actual copies of his lectures. [17]

In the opinion of Caldwell, this plagiarism attracted considerable attention, and some of Kuhn's colleagues and fellow physicians were not friendly. The implication is also that this hostility was the cause of Kuhn's resignation of his professorship in 1797.

During the yellow fever epidemic of 1793 in Philadelphia, Dr. Kuhn retired to the country with his wealthy patients, losing none of their patronage thereby. However, he saw sufficient of the disease before his departure to get himself into a controversy with Benjamin Rush over the cause and treatment of it. Kuhn held the view that it was not an indigenous disease, but that it was introduced by sailors and travellers, especially from the West Indies. He also led the opposition to Dr. Rush's method of treatment by publishing an article under his initials in the *General Advertiser* of September 11, 1793, which according to Benjamin Rush "was followed by many others from practitioners of less note."[18]

Caldwell also admitted that Kuhn was a practitioner of note, and that he was "an uncommonly skilful and successful" one.[19]

Of these latter qualifications [he wrote] I attained an intimate knowledge; because I had occasion to experience them in my own person. . . . I was once attended by him, in a severe but brief attack of bilious fever. And, as I then believed, and still believe, the judgment and skill which he manifested in the treatment of my case, could not have been surpassed. Nor were the salutary effects of his prescriptions the only things in his professional intercourse with me that attracted my attention, and excited in me an interest toward him. Not only was I gratified by the strictness and uniformity of his attention in every particular, but, serious as was my complaint, and severe my sufferings, I was not a little amused by the singular punctuality of his visits, and his unvarying self-consistency and precision in all other respects. During a portion of my sickness, he visited me three times a day. And, by my watch which hung near the head of my bed, I could predict, within less than a minute, the exact time at which he would gently tap at my chamber door.[20]

From a fellow physician, the commendation carries some weight, but the good opinion is also confirmed by another of Dr. Kuhn's pupils, S. P. Griffith, who wrote the biographical memoir of him which appeared in the *Eclectic Repertory* and was the basis of most of the later short notices such

[17] *Ibid.*, p. 124.

[18] Rush, Benjamin. *Autobiography* . . . ed. by G. W. Corner, Princeton University Press, 1948. p. 96.

[19] Caldwell, p. 124.

[20] *Ibid.*, pp. 124–125.

as that in Thacher. Griffith made special mention of Dr. Kuhn's excellent judgment.

> His kind and unassuming behavior to younger physicians, his manners void of ostentation, and his firmness and decision of conduct, will long be remembered. . . . Dr. Kuhn was not remarkable for the powers of imagination, but in sound judgment he greatly excelled. His talent for observation was profound. He was through life a studious reader, a lover of music.[21]

From these contemporary accounts emerges a picture of a thorough, methodical, and conscientious physician—observant but not one to make use of the observations in a creative way, a man who, recognizing the value of accepted authorities such as Cullen, did not see their limitations or attempt to overcome them.

Caldwell's statement that Kuhn's lectures were "in substance but a transcript from Cullen's writings" is apparently well founded. The notes taken by several of his students on his lectures agree on that and are so consistent in their content that one would conclude that the lectures were not revised, or revised very little in the course of Dr. Kuhn's teaching career, and that they were delivered at a speed at which it was possible to copy the lectures almost in their entirety.

In his lectures on materia medica, Kuhn follows the same general plan as that of Cullen's *Treatise of the Materia Medica* which was his later revision of the *Lectures on Materia Medica* published from the notes of students without his consent. Kuhn himself said in an introductory lecture:

> In the publication Dr. Cullen was not at all concerned and it appears to have been published from the imperfect notes of some Students who attended his lectures. It is not so perfect as we could wish it to be or as we would expect it to be had it come from the Dr. himself who is so ingenious a man and successful a practitioner. Imperfect as it is, it is but doing justice to the book to say that it exceeds almost everything that has here to for been published on the Materia Medica. The plan which is pursued in this work is exactly the same with the one I shall follow in this Course of Lectures.[22]

In a later set of notes there is mention of the revised edition of Cullen's work which Kuhn adopted as text when it appeared. In the notes of another student there is the following:

> I propose following the order laid down by Dr. Cullen in his Synopsis & Practice of Physick, but with ye liberty of occasionally deviating where I may happen to differ in Sentiments.[23]

[21] Thacher, vol. 2, pp. 351–352.

[22] Kuhn, Adam. Medical lectures in MS. Notes by Philip Syng Physick. 2 vols. (MS. in University of Pennsylvania Library.)

[23] Kuhn, Adam. Introductory lectures when professor in the University of Pennsylvania. (MS. in the Library of the College of Physicians of Philadelphia.)

Kuhn divided his lectures on the institutes of medicine into three parts, physiology, pathology, and therapeutics. In the first of these, he announced his intention of following Haller. There follows a list of paragraph numbers referring to Haller with clarifying or dissenting opinions on very few, and those of little significance.

From the long historical introduction to the lectures on materia medica it is easy to determine those men whom Kuhn considered important for their contributions to medical science. Cullen and Haller have been mentioned; Sydenham he says "is in justice to be considered one of the first physicians that ever existed," or in the notes of David Greenman,

> The discovery of the circulation of the Blood made little alteration in the practice of Physic till at length appeared the immortal Sydenham who was a great Physician, he introduced the simple mode of practice and gave opium freely, he first discovered that a different treatment was necessary in the different stages of the same disease.[24]

Linnaeus, whenever mentioned, is treated with the greatest respect, Boerhaave with a qualified admiration. Kuhn was aware of the medical controversies and experimentation of his day and there are many references to the work of his contemporaries in Europe. In the notes of David Greenman, it is suggested that following Sydenham

> The Mechanic System next succeeded but was very absurd consequently soon exploded. It supposed the human frame a mere Machine and that every thing was affected by their Strictum and Laxum. This was followed by Hoffman, Sthal [*sic*] & Boerhave whose different Theories at this day divide the Physicians of Europe. The Italians attribute all diseases to plethora and may be consulted in diseases arising from that cause with advantage. . . .
>
> Various have been the opinions of Authors, with respect to the cause of diseases, and in order to discover their ingenuity, they have frequently embarrassed us, with their erroneous Theories, which do not tend to promote useful knowledge. A rational foundation is undoubtedly of the greatest importance in the Study thereof; Nicholls of London & others have imagined that diseases were excited by the Soul & Borrelli considered the body as a mere Hydraulic Machine.

Therefore he concludes that

> Systems are injurious as tending to prevent a right understanding & improvement of Physic in its different branches and that Theories are only to be admitted when founded upon facts.[25]

Systems he considered "a refuge for Idleness and a kind of common place book to which the indolent may have recourse on all occasions."[26] The

[24] Kuhn, Adam. Notes taken from Doctor Kuhn's lectures on materia medica by David Greenman, 1785. (MS. in the Library of the Medical School, University of Pennsylvania.)

[25] *Ibid.*

[26] Kuhn, Adam. Medical lectures. Notes by Philip Syng Physick.

belief that "diseases are best known from experience" reappears again and again.

In the study of medicine Kuhn considered certain subjects essential:

> Anatomy as it teaches us the structure, conformation & situation of y^e^ different parts of the human frame, which is the object of the physician's care & attention is very properly considered as a most essential branch of the science of Medicine & the foundation of the others. Physiology which teaches the functions of the different organs & parts and how they are performed in a healthy state of the body is very intimately connected with Anatomy and is indispensibly necessary to be understood.[27]

In the study of disease

> we ought first to enquire into preceding circumstances, such as hereditary taints, remarkable accidents of life, manner & tenor of living; y^e^ previous condition of body & mind with the immediate or exciting cause. We should in the next place attend to all the present & moreover very much y^e^ extraneous circumstances. . . . If it terminates in death examen y^e^ appearance of the body.[28]

Diseases could be classified: "1. according to their origin: 2. according to their Seat: 3. according to their Course: 4. from y^e^ Nature of y^e^ Disease: and 5. from y^e^ Event."[29] Kuhn's general conception of the origin and treatment of disease he based upon the theory that

> our body physiologically considered consists of y^e^ Simple fibre, the Solida Viva or moving fibre & fluids: that diseases must always originate in one or other of these parts: that moving fibre, endued with Sensibility & Irritability, is more easily & oftener affected than the other two. That those Med^e^ which produce sudden & strong effects, must act primarily on the Solida Viva or Nervous System: that the simple fibre erring either in Laxity or rigidity must generally speaking be considered as a Constutional [*sic*] Infirmity & therefore less under the power of Medicines than accidental disorders. That those diseases which originate in the fluids are by no means so frq^ly^ numerous as we are led to believe by medical writers: when they do happen are rather to be relieved by gradual changes, produced by the milder remedies than by sudden & strong efforts.[30]

Proof of the fact that the cause of disease lies in the moving fibre or "sentient principles," he found in

> the Locked Jaw, which is occasioned only by the consent and sympathy of the Nervous system, and those remedies only can be relied upon for a cure that operate upon it. The Stomach is particularly to be regarded in giving Medicines, for its connection with the whole system by means of its nervous Fibres.
>
> In wounds of the head, a vomiting of poraceous Bile is occassioned, by its connection with the Liver; sickness of the Stomach also by the same rule occassions

[27] Kuhn, Adam. Introductory lectures.

[28] *Ibid.*

[29] Kuhn, Adam. Lectures on the practice of medicine. (MS. in the Library of the College of Physicians of Philadelphia.)

[30] Kuhn, Adam. Lectures on the materia medica. (MS. in the Library of the College of Physicians.)

palpitation of the heart. . . . There is also an evident connection between the Stomach, and Extremities, in cases of the Gout which seizes the Stomach, is repelled to the extremities by the use of wine, or brandy taken into the Stomach . . .

As a further evidence we observe that when Opium is given to remove Irritability, or to ease pain in the remotest parts of the body, its effects are immediately perceived, as soon as the Medecine is received into the Stomach, and cannot possibly be supposed to have reached the seat of the disease by means of the circulation of the blood.[31]

While having a knowledge of the experiments of Réaumur, Spallanzani, and others on the processes of digestion, Dr. Kuhn did not accept their conclusions since the experiments were carried out on animals or upon abnormal human beings. He admitted that Réaumur's experiments on birds were "not only ingenious but very accurate" but adds that "from this we are not to infer that the gastric fluid of man acts as that either of the Turkey or of the Hawk. In the human stomach digestion seems to be carried on entirely by fermentation."[32]

There is no doubt but that the full digestion or conversion of our aliment into Chyle depends on the mixture of certain fluids. But the first digestion in the Stomach seems to depend wholly upon a fermentation. Of this there are three Species, the Vinous, Acetous, and Putrefactive. Of their principles we are entirely ignorant. . . . The Vinous and acetous fermentations take place in the Stomach and the putrefactive occurs in the Intestines. . . . The . . . aliment is mixed in the Duodenum with the bile and is there rendered of an animal nature. Bile is another fluid which is of service for the digest of our Aliment. It is only since the experiments of Dr. Ramsay professor of natural history at Edinburg have been published that we have any tolerable notions concerning the nature of the Bile. . . . We are little acquainted with Pancreatic juice. It appears to be of the same nature with the Saliva. It probably acts principally as a diluent to the bile. It may also assist in preventing an immoderate fermentation. . . .

He then comments on the experiments carried out by Dr. Stevens of Edinburgh on a stone swallower, in which the man was induced to swallow perforated silver spheres containing different types of food. The results obtained were similar to those of Spallanzani and were published the same year as Spallanzani's first memoir, 1771. Kuhn's conclusions are that:

With regard to the experiments there is no reason to doubt the truth or accuracy of them but whether phenomena observed in a body so essentially different from the rest of the human Species should be considered as generally applicable requires the most serious consideration. It is certain that some degree of acidity is present in every Stomach and some degree of fermentation is necessary to produce this acidity. . . . Digestion then in the human Stomach appears to depend on fermentation as well as Solution.[33]

In general, Kuhn's use of diet in the treatment of disease seems to have

[31] Kuhn, Adam. Notes . . . from the lectures on materia medica taken by David Greenman.

[32] Kuhn, Adam. Medical lectures. Notes by Philip Syng Physick.

[33] *Ibid.*

been based upon sound observation of effects rather than an understanding of causes. An example may be taken from his instructions for the treatment of scurvy.

> The proximate cause of this disease must undoubtedly be a retention and accumulation of putrid humours gradually collected . . .
>
> The best preservatives against the disease are a Vegetable Diet and exercise, the first by correcting the putrescent tendency of the fluids, the latter by promoting perspiration. When the disease becomes fixed, exercise is of little use, and we must depend wholy upon a Vegitable diet and the plentiful use of Acids, such as Lemmons. . . .[34]

In his discussion of this disease he pointed out that inhabitants of southern countries do not suffer from it since they perspire freely and the humours are thus passed out of the body, that Captain Cook in his voyage around the world used a quantity of cabbage preserved with salt and that "a plentiful use thereof with Vinegar" kept the men from having scurvy. On the subject of diet he observed also

> that those who live entirely upon Vegetables, are weak, and affected with flatulency arising from too great a degree of Acidity; that those who live entirely upon animal food, are subject to Violent Inflamatory and Putrid diseases, consequently that a mixture of Animal and Vegetable food is to be prefered to either alone.[35]

The importance of the stomach in the absorption of medicines used in the treatment of disease, Kuhn believed to lie in the nervous fibres in it which transmitted the effects quickly to all parts of the body. For example:

> With regard to operation of astringents some suppose they act wholly on the simple fibres whilst others imagine they act on the nerves of the stomach and by means of them extend their action over the whole System. Those who favor the first opinion suppose that the astringent is taken up into the blood and by means of the circulation conveyed to the different parts of the body where it will exert its effects. But if we consider that if this were the case it would take some time before the medicine could produce its effects in the different parts, whereas when astringents are given internally for checking hemmorhages of distant parts, e.g. of the Uterus we find the effect produced almost as soon as the medicine has arrived at the stomach. This single consideration is sufficient to show us that this opinion is not well founded. There are however other arguments which tend to show this. Thus if the astringent were distributed thru the whole mass of blood a very little of it would arrive at a particular part and therefore to produce any considerable effects we must give it in large quantities. We find on the contrary that small doses will in a short time produce very considerable effects.[36]

The whole problem of "nervous power" and its relation to normal and abnormal physiological functions is one that keeps recurring in the notes on Dr. Kuhn's lectures, probably as a result of the influence of Haller and

[34] Kuhn, Adam. Notes . . . from the lectures on materia medica taken by David Greenman.

[35] *Ibid.*

[36] Kuhn, Adam. Medical lectures. Notes by Philip Syng Physick.

Monro. "The nervous system," he said, "has a very general consent over the whole system and thus pain and pleasure are communicated from one part to another."[37] Nervous power he believed to be a "fluid secreted in y^e^ Brain and this gives Sense & Motion."[38] It is "propagated along flexible chords." The connection between the nervous and digestive systems has already been mentioned, but he believed also that there was a greater connection between the nervous and vascular system than had been generally supposed. Nervous power was also related to muscular motion.

We have then established a nervous Power; but this goes not far in explaining muscular Motion: for this does not produce Contraction in y^e^ Nerves; this therefore must depend on y^e^ Muscles themselves, and must be owing to some peculiar organization in the muscular fibre. . . .

If Continuity is destroyed within y^e^ Body, this Contractility constantly diminishes. Muscles separated from y^e^ Body have a much weaker Irritability than if y^e^ occasional Influx of Nerves is permitted. . . . The contractile power of Muscles depends then entirely on y^e^ Nerves.[39]

To sum it up:

The Extent of the Nervous Power over the System is very considerable. It is found in the Muscles of voluntary Motion & wherever Muscular Fibres are found, in the Alimentary Canal, in the Bronchia & Lungs, in the Heart & Arteries, in the Glands & Excretions & in the whole Lymphatic & Absorbent System.[40]

Not only is the nervous power of great importance in bodily functions but it is also one of the factors contributing to the diversity of temperament, along with "the state of y^e^ simple solids, the proportion of y^e^ fluids to y^e^ Solids, the state of y^e^ Fluids [and] the distribution of y^e^ Fluids or y^e^ particular determination to this or that part of y^e^ System."[41] It is here also that Kuhn would include the part played by the soul. "The Soul," according to him, "influences y^e^ body, not as a prime mover, but as a modifier of y^e^ external senses."[42] He apparently did not elaborate further.

The simple fibre is also connected with the moving fibre or nervous system.

Ye state of y^e^ simple fibre [is] related to its *laxity* & *rigidity*. That a lax fibre implied flaccidity & debility, & a rigid fibre was a sign of elasticity & strength. I observed that y^e^ state of y^e^ simple fibre varied according to y^e^ age of y^e^ person, & that it grew more rigid as y^e^ person advanced in age; but y^t^ nevertheless something was owing to y^e^ first formation, and y^t^ some persons by nature were of a more rigid simple fibre than others.

[37] *Ibid.*

[38] Kuhn, Adam. Lectures on the institutes of medicine. (MS. in the Library of the College of Physicians, Philadelphia.)

[39] *Ibid.*

[40] Kuhn, Adam. Lectures on materia medica. Notes by Marcus Kuhl, 1790. (MS. in the Library of the College of Physicians, Philadelphia.)

[41] Kuhn, Adam. Lectures on the materia medica.

[42] *Ibid.*

I believe that it is in general little in our power to change this laxity or rigidity and that if any change does happen, it should rather be imputed to an alteration in y^e^ *vital moving fibre*. Application of Med^e^ ought therefore to be directed to this nervous power, & diseases for y^e^ most part deduced from it.[43]

The ultimate origin of flexibility and elasticity, he found in the fact that

In Nature there are only 2 kinds of Matter: One *Atoms* of one Size, figure (Spherical) and insoluble or indivisible. The other I conceive to be an elastic fluid surrounding every Atom as an Atmosphere. The *Atoms* I consider inert, only modifying their Other. A certain continuity in any two Atoms has y^e^ effect of lessening the density of their other. By this Supposition I can explain Attraction & Cohesion, to which all the properties of Bodies must be referred.[44]

Kuhn minimized the part played by the fluids in the indication and treatment of disease. "The Principles of diseases are not as is commonly supposed lodged in the simple fibres or fluids. The fluids may be affected secondarily but the Cause of most diseases appears to be placed in the solida viva."[45] This belief would alter the kind of treatment to be given to certain diseases as is evident from the following statement:

Phisicians have . . . in general considered the secreted fluids as a Criterion of the state of the fluids whereas the appearance of these different Secretions should in general be ascribed to the state of the secretory organs.[46]

Thus he would direct treatment to the secretory organs, not to a general condition of the body fluids.

One may thus conclude that there was little originality in Dr. Kuhn's general conceptions of the "simple fibre, the Solida Viva or moving fibre and fluids" of the body, their functions and treatment when diseased. He adopted the accepted theories of his day with modifications here and there perhaps, but they were the theories gathered from the work of various men, particularly Cullen, Haller, and Monro. Of this he said:

The present system is now complete and takes in all the Parts tho by no means perfect. Altho Anatomy, Botany and Chemistry seem to have arisen to their highest degree of Perfection nearly, Medicine seems at present to be in a low state.[47]

Materia medica, on the other hand

has been brought to its present state of perfection and almost all Medicines discovered either by ACCIDENT, INSTINCT, or promiscuous EXPERIMENT. By Accident we mean the discovery of Medicines undesignedly made. . . . By Instinct we meant that direction which in different degrees is diffused thro all animals directing them to choose what is good and avoid whatever is evil or destructive to them. This faculty is possessed by man in a degree far superior to the rest of the animal Creation. . . . By promiscuous

[43] *Ibid.*

[44] Kuhn, Adam. Lectures on the institutes of medicine.

[45] Kuhn, Adam. Medical lectures. Notes by Philip Syng Physick.

[46] *Ibid.*

[47] *Ibid.*

Experiment we intend remedies found out by reason or instincts, in this way many valuable remedies have been discovered.[48]

The remedies so discovered consisted largely of the customary use of bleedings and purgings with a frequent use also of opium and Peruvian bark. In his treatment of disease he followed Cullen but with rather more emphasis on diet.

Dr. Kuhn accepted the idea that an appropriate drug was to be found in each country for the diseases peculiar to it.

We have reason to believe that nature has supplied every country with remedies for the diseases that are peculiar to it. He would be denying the goodness of the Supreme Being to doubt of this, had we not sufficient reasons otherwise to convince us of the truth of it. A few instances will place the matter beyond all possibility of doubt. The Goodness of the supreme Being appears in Nothing more remarkable than in having provided antidotes for the bites of venemous animals. . . . In this Country where the rattle Snake is the most venemous animal we have many powerfull antidotes among which is the Seneks Snake Root.[49]

The belief in the Divine goodness occurs again in the notes for an introductory lecture on natural history.

Nothing is created in vain and even y^e^ most trifling productions are often of infinite Service in y^e^ oeconomy of Nature & in y^e^ end terminate to y^e^ advantage of Man.

No science is better calculated to lead us to a consideration of y^e^ infinite Wisdom & power by which every thing in this world is preserved and propagated.[50]

Kuhn believed also that in the natural economy each plant had its particular station, that it in turn had particular insects that fed upon it, which in turn also had particular enemies to keep them from becoming too numerous. Each unit in nature was adapted to the circumstances of its particular station, to prove which he used the example of the methods of propagation of seeds, those of water plants being scattered by the streams in which they are found.

Unfortunately, only the notes of the introductory lecture on natural history seem to have survived. However, Kuhn proposed, after laying down the principles of the Linnaean system, to

proceed to an examination of y^e^ plants and be more particular in y^e^ demonstration of y^e^ different parts of y^e^ plant. The proper method of describing a plant will next take up our Attention . . . Rules how we are to judge of y^e^ Virtues of plants by y^e^ affinity they bear to others already known.[51]

In the last connection, it is interesting to note that Dr. Kuhn did not accept

[48] *Ibid.*
[49] *Ibid.*
[50] Kuhn, Adam. Introductory lectures.
[51] *Ibid.*

the theory that plants of the same genus had the same virtues without some qualification and in the notes on materia medica warned:

> The celebrated Linnaeus has followed the botanical order in describing the virtues of the Substances belonging to the Materia Medica but tho plants of the same order and genus are frequently found to correspond in medical virtues, yet as it does not hold universally it is liable to exception.[52]

There is no evidence that Dr. Kuhn made any contribution to the study of natural history, particularly botany, and his early interest and training under Linnaeus in this subject bore no fruit. He turned rather to the practical applications in medicine.

As a physician he earned for himself the reputation of a careful and methodical practitioner esteemed by his patients and respected by his fellow practitioners, whether or not they agreed with him. While contributing nothing to the development of the science of medicine, he played a considerable part in the early medical education in this country. At least two of his apprentices became well known in their chosen fields: Philip Syng Physick as a surgeon and professor of surgery and anatomy, and Thomas Chalkley James as an obstetrician. However, many more students would have been influenced by him between the years 1767 and 1797 when Dr. Kuhn was teaching at the College of Philadelphia and the University of Pennsylvania, and from him they would have had an outline of the development of medicine with a synthesis of prevailing opinions for their acceptance. He probably was a little dull as a lecturer, certainly he lacked the force and originality of Benjamin Rush, but both his educational background and the notes of his courses would suggest that he offered to his pupils a careful and methodical account of those subjects which he taught, keeping to a middle course between the more extreme theories of his day.

[52] Kuhn, Adam. Medical lectures. Notes by Philip Syng Physick.

William Hunter's Early Medical Education

Part II*

He Goes to London to Complete his Studies and Remains There

FENWICK BEEKMAN†

WILLIAM HUNTER arrived in London sometime near the first of November 1740, following a perilous journey. Having decided to make the move by sea, he embarked from Leith, the port of Edinburgh, on Saturday the twenty-fifth of October. During the voyage he narrowly escaped being shipwrecked when a storm arose which caused extensive havoc to nearby vessels. After his safe arrival the young man, who never before had been at sea, wrote home of his frightening but valuable experience in a most dramatic manner:

> The sea broke on us with such violence that our men on deck could scarcely stand the shock of the waves and nothing was commonly above water but the quarter deck. Our danger was so evident that the sailors neglected the complaisance of soothing the passanger with the least hope. The noise of the storm was so great, the night so dark, the motion of the ship and hurry of the sailors so confounding, and terror and death painted so strong in every face that I think I have got a sufficient trial of myself in danger and confusion and in such a way as to give me pleasure on reflection.

The dangers he had undergone appear to to have made a profound impression upon the sensitive emotions of the youth, for when describing his experience he reveals his sympathetic feelings towards the less fortunate of the voyagers. On continuing his narrative he writes:

> Our ground tackling was luckily better than ordinary and we had great services done by the Navy and Merchantmen gentlemen [who were passengers aboard the ship] for our preservation; by these means we rode it out in safety for which I shall ever be thankful. In the morning on the Sabbath we saw the lamentable effects of the night on the vessels that were at anchor beside us. Three or four of them were considerably damaged, two sloops were amissing, and as we judged, lost; one large ship and a sloop were shipwreck'd just by us on the Meitland bank. We imagine the sloop's crew were lost, for one man had endeavoured to save himself by climbing the mast and fastening himself in the cordage, but was chill'd to death and hangs like a malfactor. Some at least of the ship's crew were alive and crawling on her side they hung out a signal for help, but no boat could make them, the sea was still so rough. On Monday some of

* Part I appeared in the previous issue of the *Journal*.

† New York City.

them were still alive which we thought surprizing. Their situation mov'd me with the most sincere and melting compassion.

On his arrival in London, William Hunter appears to have taken lodgings at first with a Mrs. Gray, who lived opposite the King's Arms Tavern in the Strand near Charing Cross. He did not, however, remain there long, for having sought out William Smellie who lived "in the New Court, formerly the Key and Garter Tavern, over against St. Alban's Street in Pall Mall," he shortly moved there.

Smellie, on leaving Lanark in the autumn of the year 1738, had come to London so that he might attend lectures on midwifery; but finding no course there that he considered worthwhile, he continued on to Paris where he discovered that the teaching of the subject was little better than in the English capital. He then returned to London and opened an office as surgeon-apothecary, determined to practise midwifery and, when established, to teach it.

Though Smellie was a comparative newcomer to London and was also a rather uncouth countryman, he had nevertheless made friends with a number of influential persons. He joined a group of Scotsmen, young ambitious men who had banded themselves together informally on a friendly basis for self-protection against the English, who had little use for those who came from north of the Tweed. The English physicians discriminated against all those who had received their doctorate of medicine from any source other than Oxford or Cambridge by refusing them the privilege of fellowship in the Royal College of Physicians of London; and the surgeons, at this time members of the Barber-Surgeons' Company, discouraged candidates from Scotland from taking their examination for qualification to practise. This antipathy against Scotsmen in London was said to have begun some years earlier, owing to the great business success of the Scottish merchants in the City. The prejudice, though evident in 1740 when William Hunter arrived in London, became much more marked after the Jacobite rebellion in Scotland during the year 1745, for participation in which not a few Scotsmen lost their heads which were placed on view before the populace on Tower Hill. Of these may be mentioned especially the unfortunate rebel leader Dr. Archibald Cameron, whose drawn-out trial and eventual execution kept popular feeling aroused long after the decisive victory at Culloden. All of this passion naturally increased the prejudicial feeling of the English against the Scotsmen in London and resulted in the latter forming their own cliques.

It is presumed that Smellie introduced his young protégé to many of

his friends. But William Hunter also carried letters of introduction concerning a few of which we have some information. In his earliest letter to those at home, probably to William Cullen, he writes: "I am just come from Forrest Coffee house with Mr. Smellie. He is very well and seems very kind but I can tell you no particulars yet. I have seen none of the other gentlemen. To-morrow morning I go to Mr. Pringle, as soon as I do anything I shall give you notice." Peachey writes concerning this last sentence that the Mr. Pringle who is mentioned therein was possibly identical with John, afterwards Sir John Pringle. This fact would be of interest if it could be established that John Pringle was in London at that time (November 1740). But the facts as given by Pringle's biographers are against this assumption as they state that he practised medicine in Edinburgh from 1730 to 1742, after which he joined the armies upon the Continent and did not return to London until 1748.

Apparently the most influential physician of Scottish birth practising in London at the time of William Hunter's arrival was Alexander Stewart or Stuart (the name is written either way), of whom but little is known. He was a friend of Sir Hans Sloane to whom he sent, while acting as surgeon on a merchantman, some specimens and curios. Later he graduated from Leyden and then settled in London. Becoming physician to the Westminster Infirmary at the time of its founding in 1719, he went over later, on the secession of its staff in the year 1733, to St. George's Hospital, of which institution he became senior physician. It is said to have been through the influence of Sir Hans Sloane that he was appointed Physician-in-Ordinary to Queen Caroline, an office which resulted in his being granted the degree of Doctor of Medicine from Cambridge by royal mandate, and thus made possible his admission as fellow of the Royal College of Physicians. Stewart had become a fellow of the Royal Society and was a recipient of its Copley Medal in the year 1740 as a reward for his lectures on muscular motion in which he reported the findings of his investigations on the structure and function of muscles.

Smellie, on his first arrival in London during the winter of 1738–1739, had sought out Stewart to whom he had a letter of introduction, "most likely from his friend Professor Monro of Edinburgh," to obtain advice as to his future moves. Although William Hunter also may have carried a letter from Monro to Dr. Alexander Stewart, we may nevertheless be sure that Smellie would have made the introduction if he had not been the bearer of such a note. We do not know the nature of the advice received by the young Scot from this "man of eminence and importance in the medical

profession," as Peachey calls him, "but William Hunter's acquaintance with him must have been short, for Stuart died 15 September, 1742."[1]

Smellie apparently saw to it at once that his young friend and protégé received instruction on those subjects necessary for a surgeon to know, and it seems only natural that he chose the same teachers under whom he had sat two years previously, that is, John Theophilus Desaguliers, lecturer on natural philosophy, and Frank Nicholls, lecturer on anatomy.

In London during the first half of the eighteenth century, Desaguliers was the most outstanding teacher of natural philosophy, a subject that is said to have been made popular through Newton's discoveries. Born in France, he had been brought to England in infancy by his father, a Huguenot refugee. His early education had been received from this same parent who at the time was pastor of the French Chapel in Swallow Street made familiar to us through Hogarth's depiction of it in one of his famous prints. He attended Christ Church, Oxford, where he received the degree of Bachelor of Arts in the year 1710. This same year saw him appointed lecturer of natural philosophy at Hart Hall, succeeding Dr. John Keil who, he informs us, was the "first who taught natural philosophy by experiments in a mathamatical manner . . . instructing his audience in the laws of motion, the principles of hydrostatics, and optics, and some of the chief propositions of Sir Isaac Newton concerning light and colours." Having taken the degree of Master of Arts in the year 1712, this young teacher of natural philosophy then moved on to Westminster, where he continued to lecture at his residence in Channel Row. The Royal Society elected him to fellowship in the year 1714, and he became at once demonstrator and curator to that distinguished body, thereby being excused from paying dues because of the number of interesting experiments "he shewed at the meetings." He became the inventor of the planetarium, as well as other useful mechanical devices, and presented numerous learned papers before the Royal Society, which may be found in their *Philosophical Transactions*. In February, 1736, he received the coveted Copley Medal "in acknowledgement of his successful experiments," the highest award that that learned body could grant. Sir Isaac Newton, President of the Royal Society at that time, is said to have held Desaguliers in the highest esteem.

His private lectures were illustrated by experiments and although on learned subjects were popular and well attended not only by those in search of knowledge but also by numerous members of the fashionable set of London. His reputation having come to the attention of George I, Desagu-

[1] Peachey states that many of Stewart's letters and papers are among the Hunterian manuscripts.

liers was commanded in 1717 to present his course of lectures at Court, for which he received an annual grant of seventy pounds for the remaining years of his life. In 1730, he repeated his course of lectures in Holland, where they were commended most highly by learned men, among whom was Boerhaave.

During the winter session of 1740–41, when William Hunter attended them, the lectures were being given at Desaguliers' lodgings in Bedford Coffee-house over the Great Piazza in Covent Garden. From these lectures we may presume that William Hunter not only obtained a knowledge of physical phenomena but, more important, he learned the various ways of gathering facts in the course of experimental investigations and, having procured them, learned how to use them in reaching conclusions through inductive reasoning.

Frank Nicholls was, with the possible exception of William Cheselden, the leading teacher of anatomy in London at that time. He was not a surgeon but a physician, a graduate of Oxford some fifteen years previously, and a fellow of the Royal College of Physicians. He was the son-in-law of Dr. Richard Mead, a famous physician as well as a learned student of antiquity and the fine arts. Nicholls was about forty-two years old at this time and had been making dissections of the human body almost continuously from the time he had become a student at Oxford. After receiving his degree of Bachelor of Medicine in 1725, he was appointed to the office of reader of anatomy at the University, a position he held for four years until he was granted the degree of Doctor of Medicine. For a year or more after this he practised medicine in Cornwall, but longing to continue teaching, which he enjoyed, he visited the Continent in order to improve his knowledge in the newer anatomical methods used for instruction; in Paris he worked under Winslow and in Italy with Morgagni. He became particularly interested in the microscopical structure of the tissues of the body, and it is said that he demonstrated the coats of the arteries before the Royal Society, to which he had been elected fellow in 1728, and through experiments showed that the inner and middle coats could be ruptured while the outer remained entire, thus demonstrating the formation of aneurisms. He found the vasomotor nerves and suggested that they might regulate the blood pressure. Though he is reputed to have invented the method of making corroded preparations of dissections, this appears to be an error as Cole has pointed out that Bidloo and Cowper had anticipated him by at least forty years in this technique; he nevertheless became noted for the preparations he produced in this manner.

Nicholls had been lecturing in London for ten or twelve years when in the autumn of 1740 William Hunter paid him his fee of forty guineas so that he might attend the course of thirty-nine lectures. The syllabus for this course of lectures reads: "A complete Course of Human and Comparative Anatomy in which the OEconomy will be explained, and the progress from Anatomy to the several branches of Physick illustrated, by proper lectures on the blood, medicines, and the theory and practice of midwifery." Included in addition was instruction in the cutting for stones. This was considered a systematic course of lectures in that day, though we may query the possibility of touching upon, even in the most superficial manner, so many subjects in so few lectures. The only observation made by William Hunter concerning this course of lectures presented by Frank Nicholls was written many years later. Having first criticized Monro's methods of teaching anatomy while he had been a student at Edinburgh (as already quoted), he continues:

> And, in the only course which I attended in London, which was by far the most reputable that was given here, the professor used only two dead bodies in his course. The consequence was, that at one of these places, all was harangue; very little was distinctly seen: in the other, the course was contracted into too small a compass of time, and therefore several material parts of Anatomy were left out entirely.

During the first part of the year that William Hunter resided with Smellie, the latter was completing his final preparations in anticipation of becoming a teacher of midwifery, and sometime during the winter or spring months of the year 1741 he launched himself upon this venture which was eventually to carry him forward to the position of leader in the reformation of British midwifery. Because of his close relationship as lodger and protégé of this great man, it seems certain that Hunter must have learned much of importance concerning both the science and art of midwifery during this year. In planning his teaching, Smellie had decided to instruct his pupils in the theory as well as the practice of this specialty, providing an elementary course for instruction in handling the normal case, and a more advanced one concerned with the abnormal conditions occurring in the practice of midwifery. In order to demonstrate the mechanism of labor to his students, Smellie had constructed, with the assistance of his friend Desaguliers, a "machine" (known to the student today as an obstetrical phantom) far more accurately built and complete than had been provided by any former teacher of this subject; for by careful scientific investigation during his many years of practice in Scotland he had determined the exact measurements of the pelvis and discovered the vari-

ous positions of the foetal head during its descent through the birth canal, in cases of both normal and abnormal presentation. Holding no hospital appointment, he had built up a large practice among the poor, a clientele of women who were willing to entrust themselves during labor to a man midwife who brought students to their bedside for instruction. And insofar as he had been able, Smellie made friends when he could with the least antagonistic of the midwives, hoping that they might call on him for assistance when faced with complications which they knew were beyond their ability to handle. He had in this manner obtained a sufficient amount of clinical material for use in the instruction of his students.

Although William Hunter has not informed us of having received particular instruction from William Smellie, we do know that he held a sincere admiration for the ability of this fellow Scotsman, and it may be assumed, I think, that during the ten months or so that he resided with him he must have been imbued with a strong incentive to follow in the footsteps of his friend and prepare himself for a career in the practice of midwifery. There seems no doubt that he learned much of value concerning both the art and science of this specialty from this remarkable countryman of his who had come from Scotland not to learn but to teach a subject which he knew had been neglected by those who were in a far more advantageous position to instruct than he.

Having been in London for close to a year, William Hunter must have realized that his allotted time for study in the English capital was rapidly drawing to a close. Though he had learned a great deal that was new to him through lectures, study, and experience, he apparently realized, almost bitterly, that he had not been given an opportunity personally to investigate the anatomy of the human body. He had apparently gone to London with the expectancy that he would be allowed to do some dissecting himself, but almost a year had gone by and he had not as yet received the least encouragement towards satisfying his hope. Naturally he was deeply disappointed, for it must have seemed to him quite useless to have spent the time and money in London in preparation for a career in surgery and not to have had practical work in the study of anatomy; and now he was to return to Hamilton to take up the practice of surgery as William Cullen's partner without having had, as he thought, sufficient training to do so. But suddenly all his unhappiness was banished, for quite unexpectedly he received an advantageous and attractive offer to become an assistant to an outstanding physician whereby he would settle permanently in London and perhaps be launched in a year or two upon his own career. He would receive further

training in midwifery and obtain every facility necessary for anatomical investigation. And to make the offer more perfect, he was to reside with his patron and master in a cultured Scottish family. It is not surprising that he requested Cullen to release him from their compact, to which the elder man apparently acquiesed willingly.

Among the Scotsmen whom William Hunter had met during the months he had resided with Smellie was James Douglas. Simmons informs us: "He brought with him a letter of recommendation to his countryman Dr. James Douglas, from Mr. Foulis,[2] printer of Glasgow, who had been useful to the doctor in collecting for him different editions of Horace." James Douglas appears to have become at once attracted to the young man because of his personality and enthusiasm for his work and after two interviews, it is said, "invited him into his family to assist in dissections, and to superintend the education of his son."

Dr. Douglas, at this time a man in his sixty-seventh year, was well known to the public of London for his ability as a clinical obstetrician and to the profession for his capability as an anatomist. His fame as an anatomical investigator rests on the description of the peritoneum which he published after dissecting out the peritoneal pouch with its contained viscera from within the abdominal walls in order to demonstrate the safest approach to the bladder when performing the high operation in cutting for stone. His name has been carried down to us in anatomical nomenclature through the description of the fold of peritoneum in the pelvis known as Douglas' pouch. Among other anatomical writings of importance, James Douglas had published, soon after starting his career in London at the beginning of the century, a well-known and popular book, *A Comparative Description of all the Muscles in a Man, and in a Quadruped,* one of the earliest works on comparative anatomy to appear in print. Though he had not graduated from either of the English universities but had received his medical degree from Rheims, he was nevertheless admitted an honorary fellow of the Royal College of Physicians. Having contributed several papers of some importance to the *Philosophical Transactions* of the Royal Society, to which he had been elected to fellowship in the year 1706, he was thus further recognized for his scientific spirit.

Besides his professional attainments, James Douglas was a highly cultured man, a bibliophile whose particular field of interest was first editions of Horace, and with the assistance of Robert Foulis he had assembled the

[2] Robert Foulis (1707–1776) who, as pointed out in a previous paper by the author, had been a fellow student of William Hunter at the University of Glasgow.

finest collection of this author's works that had as yet been brought together. This pursuit had helped to give him entrance into that group of intellectuals who frequently gathered together in the salon of Dr. Richard Mead's spacious mansion in Great Ormond Street, where he met almost all of those of importance in the world of letters and art of London. Pope has immortalized him in the Dunciad:

> To prove me, Goddess! clear of all design,
> Bid me with Pollio sup, as well as dine:
> There all the learn'd shall at the labour stand
> And Douglas lend his soft obstetric hand.

Through his professional contacts, those he conferred with at the Royal Society and the many friends he met at Mead's, James Douglas gained an acquaintance among almost all the worthwhile people in London.

Although William Hunter apparently had had little difficulty in obtaining permission from William Cullen to dissolve their proposed partnership in order to take advantage of this handsome offer from James Douglas, it was not as easy for him to gain the wholehearted approval of the venture from his ageing father. This stalwart but kindly parent, who was then close on to eighty years of age, seems to have been much disappointed that his son desired to remain away from home; but the infirm old man was nevertheless too unselfish a character to stand in William's way of advancement through an association with Dr. Douglas. Though the letter which he wrote his son has been quoted by the author in a previous paper,[3] it should not be omitted at this time, filled as it is with pathos and bravery when he was faced with a young man determined to succeed in his career. John Hunter, Sr. wrote to his son William:

> Nothing has proved a greater comfort than the hopes of seeing you here soon; but your letter has cast a very great damp upon us all. I think you have been in a very extraordinary manner obliged to Dr. Douglas, and whatever opinion I may have of his present offer, or however unwilling I may be to consent to it, still I must thankfully own it, as a particular instance of his kindness to you. I surely must soon expect to be beyond this side of time, considering my age and present indisposition, being for some days past confined to my bed with sickness, and a severe fit of the gravel, and would be glad to have you near me for the little while I shall be in this world; though at the same time I should be sorry to hinder you from making your way in the world, the best way you can.—I wish you to consider well what you do.—With Dr. Cullen you may be very comfortably settled, and make money, and if you miss this opportunity now, you cannot be sure of it at another time.—Dr. Douglas's kind offer is only for a time. He may die before you come home or are settled, and leave you without friends at a great enough uncertainty. I suppose now you know very well the difference between the expence of living at home and abroad, and that perhaps cloaths and pocket-money may cost you more than your whole expence at home would do. You know my willingness

[3] This was printed in "Long Calderwood, the birthplace of the Hunters."

to assist you, but you know too, that already I have gone fully as far as my numerous family will allow of.—You must now do something for yourself.—Consider all these things, and if you can persuade me that it is for your good, I will not be against it.

There is every reason to believe that after this William Hunter did not find it difficult to persuade his father to give his approval of the offer, because it is found that he moved to the residence of his new benefactor on Red Lion Square sometime during August or September of the year 1741. Here he was at once welcomed into the family by Mrs. Douglas and her children.

Dr. Douglas was engaged at the time in preparing a large and handsome work on osteology, for which many of the copper plates for the illustrations had already been engraved. But others were needed, and Hunter was forthwith put to work to learn the art of dissection so that he might soon be given the task of making preparations for use as models for drawings. This was a new experience for the young man, but one for which he had long waited—to be allowed to make dissections himself. He undertook the task with alacrity, and it was not long before he became an expert. Unfortunately the work on osteology was never completed, and today the plates, sixty-eight in number, and a portfolio of proofs can be found among the books and manuscripts in the Hunterian collection at the University of Glasgow.

Douglas' anatomical preparations were well known for their beauty as well as their value in teaching. On visiting London, Albrecht von Haller of the University of Göttingen saw them and expressed great admiration for the skill with which they were fashioned. John Freind in *The History of Physic* writes: ". . . one ought to see the curious preparations of that diligent and accurate anatomist, Dr. Douglas, who is the first who has given us any idea of the peritoneum. . . ." I think that we may be sure that when Douglas' enthusiastic and diligent assistant had any leisure from his work in the dissecting room he could be found in the museum studying these preparations.

Douglas desired, it seems, to round out his young assistant's medical education by providing him with the advantage of some clinical instruction in surgery in addition to what he was receiving in midwifery from Douglas personally. To accomplish this William was entered as surgical pupil under James Wilkie[4] at St. George's Hospital. It is unfortunate that

[4] Though little is known of Wilkie, Peachey believes that he was of Scottish extraction. The first that can be learned of him is in 1720 when he was elected surgeon to the Westminster Infirmary from which he was already receiving a salary as apothecary. He became a subscriber to St. George's Hospital in 1733, and almost at once seceded with the other members of the staff of the Westminster Infirmary over to St. George's, where he became senior surgeon. He retired from the staff in 1743–1744 and died apparently a year to two later.

beyond the fact William Hunter tells us that he was a student at St. George's in 1741 and 1742 we are unable to find any further information concerning the instruction he received while there.

It was just after the commencement of the session at St. George's that William received the sad though not unexpected news of his father's death. In consequence the property at Long Calderwood passed into the possession of his elder brother, James, who had been studying for the law. But James apparently was not favorably impressed with that profession and, now being his own master, came to London to visit his brother. Everard Home informs us in his *Life of John Hunter* that he became so "captivated by the pursuits in which he found his brother engaged, that he purposed to follow them himself and become a practitioner of physic." It is said that he showed such unusual skill that William remarked some years later: ". . . that if he had lived to practise physic in London, nothing could have prevented him from rising to the top of his profession."

It was on the 11th of April, 1742, that the grave event forecast by old John Hunter in the letter written to his son less than nine months previously came to pass. For on that day William Hunter's kind benefactor, James Douglas, died following a short illness. Whether this event occurred before or after James's arrival in London is not definitely established. It would appear, however, to the author that the doctor more probably died shortly after James's visit began, for William in writing to his mother some time later says: " 'Tis in vain to say that neither Jamie or I are losers by the accident; . . ." This, I think, seems to imply that James was there at the time of Douglas' death.

William Hunter had thoroughly endeared himself to the Douglases during his six months of residence and become almost another son in the family. This relationship is brought out in that same letter to his mother in which William speaks of his and Jamie's future:

> You'll no doubt wish to hear of my affairs, and to satisfy you I'll be a little particular. Tho' Dr. Douglas during his short sickness minded his worldly concerns but little, yet he died not without recommending me warmly to his family. No friends or relations were admitted to see him, his fever being tumultuous and precipitant, and leaving him only a few intervals of ease or tolerable composure of mind. During the last of these I received orders from him of being in the way, and that he wanted to speak to me as soon as his head was a little settled. But immediately I had another message telling me that he was worse and must defer seeing me. This was the night before his death. Early next morning I was call'd at his desire, when he thought himself pretty easy. I went in, he snatch'd my hand, and spoke a few words with too great affection for his giddy disorder. Immediately his fancy wander'd and tho' he could not talk sensibly, yet he still knew me, and would not let me go out of the room. I sat on his bed till after noon,

when he expir'd with his hand locked in mine. At his death I had mournings and a Ring from Mrs. Douglas. Then I was told that on his death-bed he acquainted the family that I should go to Paris, and that I must go. . . . I have the happiness of being agreable to the whole family so far as I can guess by their beheaveour. After I come from Paris I have a scheme laid out of settling here, and certainly nobody can say that it will not succeed. But I'll say no more of projects lest you think me a Castle builder.

During the six or seven months that he worked for James Douglas as an anatomical assistant, William Hunter had a rare opportunity to obtain instruction in dissection under the supervision of one of the outstanding anatomists of that time, and consequently learned the latest techniques for making preparations to be employed when teaching. So enthusiastic had he become that he decided at this time to equip himself by acquiring further knowledge for the teaching of anatomy. This is undoubtedly the "scheme" referred to in his letter to his mother. Having had so much to do with the preparation of the plates which Douglas expected to use for illustrating the atlas of anatomy on which he was working, William Hunter must have realized even then that he should become the author of some work on anatomy, and it seems not at all improbable that, as early as this, remote plans were being formed in his mind which in a few years' time were to result in the launching of the preliminary work on that great masterpiece of his, the jumbo folio of "anatomically exact and artistically perfect" prints, the *Anatomy of the Human Gravid Uterus Exhibited in Figures,* which appeared in the year 1774.[5]

William Hunter had moreover received valuable lessons from his kindly and courteous master in the practice of obstetrics. It was while still in residence with Smellie that he had decided to prepare himself as a practitioner of midwifery. He had laid the foundation of his training while under the roof of his fellow Scotsman in Pall Mall. From this association he had become impressed, as Peachey suggests, "with the importance of what Lord Chesterfield called 'The Graces' " for making a success of such a career. Consequently he had more than welcomed the opportunity of becoming associated with one who enjoyed a large and fashionable practice among the wives of the important men of London. Commenting on this Peachey writes:

There is little doubt that the instruction he had received from William Smellie during those ten months laid the foundation of much of his subsequent success, while the somewhat awkward and uncouth manners of his teacher and fellow Scotsman . . .

[5] An announcement appeared as early as October 1752 that: "subscriptions for his *Anatomy of the Pregnant Uterus* are taken at Mr. Miller's book-seller in the Strand and at the author's in Little Piazza, Covent Garden, where one plate already published by Mr. Strange may be seen as a specimen, and where the Proposals may be had."

taught him a useful lesson, by suggesting to him the cultivation of the more courtly bearing which subsequently procured for him his appointment to Queen Charlotte.

Through his residence with Douglas and his wife, William Hunter must occasionally have met some of their many friends, people of breeding and discernment, who undoubtedly impressed him with a desire for the amenities of life and a wish to develop some cultural pursuit as a means of diversion from his professional studies. The atmosphere of this home was not unlike that at Long Calderwood, although there were many more comforts here, and Mrs. Douglas probably reminded him in many ways of his kind and affectionate mother. And then there was Martha Jane, the daughter of the family, about twenty-five years of age, to whom from the first he had been attracted. A courtship ensued and eventually they became engaged. The one unhappy and jarring note in this household of kindly Scottish people was the behavior of William George, the Douglases' only son, whose escapades were already causing his parents sadness. William Hunter, who had been brought into close relationship with the lad as his tutor, tried in vain to interest him in worthwhile studies.

Though disappointed and dismayed by the loss of his friend and master, William Hunter was far from being dejected and disheartened by this apparent disruption of his plans for the future. Instead he was goaded on by the calamity to independent activity. Dr. Simmons writes of this transition to independence as follows:

> This event, the probability of which his father had pointed out to him, does not seem to have retarded his progress. Such a loss, and at so critical a period, would probably have destroyed the hopes of any man of less abilities or industry than he possessed. But he seems by this time to have had a consciousness of the superiority of his talents, and he who feels himself equal to great things will not easily be dismayed.

Having burned his bridges behind him, William Hunter could hardly have returned to Scotland to renew the partnership with Cullen, even had he so wanted; but he did not wish to leave London and in consequence had to alter his plans to fit the new situation. It was decided that he and his brother James would continue to reside with Mrs. Douglas and her children on Red Lion Square. Because of the war with France he could not visit Paris that year, and it was not until September 1743 that the journey was made, cessation of hostilities having occurred after the Battle of Dettingen in June. We have not been informed of what he did during this interval, so that much has to be presumed. Dr. Simmons says: "The death of Dr. Douglas made no change in his situation. He continued to reside with the doctor's family, and pursue his studies with the same diligence as before." But though he may have "pursued his studies with the same dili-

gence as before," he was now under the handicap of having no one to guide him in his work. It is probable that he and Jamie used the facilities of Douglas' dissecting room, museum, and library to their best advantage, and during a part of each day young William George Douglas was given a certain amount of instruction. Besides this, as Peachey tells us, he may have continued with the instruction in clinical surgery at St. George's Hospital.

We know it was during this period that he undertook his first piece of investigation, work that resulted in the publication of an important communication in the *Philosophical Transaction* of the Royal Society in the year 1743 (vol. 43, p. 514), entitled "Of the Structure and Diseases of the Articulating Cartilages." In this paper he describes the *circulus articuli vasculosus* which since that time has borne his name. John H. Teacher writes of this:

> The paper is a very interesting one, and was a solid contribution to the knowledge not only of the anatomy but also of the pathology of the joints: it and the fine series of preparations [to be found among those in the Hunterian Museum in Glasgow] upon which it was founded, show that already he was a competent anatomist and a skilful dissector and injector.

It was sometime during the spring or summer or perhaps as early as the winter of the year 1743 that James Hunter returned home to Long Calderwood broken in health with pulmonary tuberculosis to which he succumbed in 1745. On September 17th of the following autumn, on the eve of his departure to Paris accompanied by young Douglas, William wrote Jamie a letter which supplies us with important information. We learn of William's disappointment because of his lack of ability to sketch, for Jamie was most adept with pen or pencil and had painted a portrait in oils of their father. He encourages his brother to prosecute his studies in pharmacy and surgery and suggests that he take Monro's course in anatomy. He informs Jamie of the fact, which must have given him joy, that he had settled with their creditors in London to the amount of seventeen pounds. Continuing, he writes:

> The kindness that I have met with in this family of late is infinitely more than I deserve and a great deal more than I expected. In your prayers put in a word for good Mrs. Douglas. I need not mention particulars but everything will be to my wish [this apparently refers to his engagement to Martha Jane]. But as I have now given you my past History I must now let you in my views after I come home.

His "views" were a scheme whereby he was to become a partner of Robert Owen, son-in-law of the late John Douglas (the brother of James Douglas). He writes of the advantages of the plan—that Dr. Owen had inherited John Douglas' practice and that: "John Douglas told Dr. Owen that in the

last three years he had made £4000, and tho' this may seem a piece of extravagance, yet I'm persuaded that Dr. Owen, who is under no necessity of following business, would not engage in the scheme without any probability of large profits. In the next place [and probably the most important to him] I thought it the only way to settle in my darling London, and be useful to you or Jockie." The plan, however, did not materialize, for no more is heard of it.

On their arrival in Paris, William Hunter at once set about arranging for their studies, but young Douglas refused to co-operate with him, preferring to lead a life of pleasure and dissipation to one of study. Hunter, thus relieved of his responsibilities, left the young man to his own devices and signed himself up to enter a course in anatomy under M. Antoine Ferrein (1693–1769) of the Royal Academy of Science in Paris and professor of medicine and surgery in the Royal College of France. Ferrein's reputation as a lecturer on anatomy was great and he was the author of many monographs on medical matters. His course extended from the middle of November to the end of March and apparently consisted—according to Peachey—of seventy-nine lectures. Teacher, who has examined a manuscript of William Hunter's, which is in the library of the University of Glasgow, entitled "An Abstract of the Most Remarkable Things in Mr. Ferrein's Course of Anatomical Lectures, read in 1743–1744," informs us that:

> The course therefore lasted at least five months, and consisted of about one hundred lectures. William Hunter's attitude towards the lectures is decidedly critical. He had done work that entitled him to criticise. He had taken very full notes of many of the lectures, but a considerable number of them he dismissed with the remark that "they contained nothing new." He had reason to differ from his master in regard to the articular cartilages, and to judge by the papers he published within the next few years, he found many other points open to criticism and correction.

Notwithstanding this derogatory criticism of the instruction given by M. Ferrein, it is probable it was during this visit to Paris that William Hunter familiarized himself with the methods of teaching employed in the French schools of anatomy—methods which he was soon to use himself, introducing and making them popular in England. Chief among them was provision for each student to become familiar with the structures of the body through dissecting it himself, something that had been unheard of in England before this. Later he wrote of this innovation:

> I should wish no student to engage in dissections, till he had attended a complete course of demonstration: otherwise, he will be so much at a loss in his work, and receive so little instruction or satisfaction, that at best it will be so much time almost

thrown away. . . . But, when once he is prepared for this part of his education, he cannot dissect too much. Our lectures are not intended to make men Anatomists, but only to furnish them with such a knowledge of the subject, as will enable them to prosecute the study with success; . . .

William Hunter returned to London sometime during the spring of 1744, for it is found he wrote Jamie in June giving him an account of his sojourn in Paris. By now the desire to be an anatomist had become a determination, and he proceeded to make arrangements to establish an anatomical school.

On his arrival in London he went to reside once more with Mrs. Douglas, but not on Red Lion Square as she had now moved to Hatton Gardens where he began at once to make himself ready for his future as teacher of anatomy. Much of the happiness for him in this Scottish home, however, had gone forever for Martha Jane Douglas, his fiancée, died sometime during this year.

From now on, William Hunter must have spent most of his time working on preparations—using the skill for which he was noted in injecting, dissecting, and mounting parts of the human body—to be used for demonstrating to his students, because he well knew that he must have these to supplement the fresh dissections that would be employed in his lectures. In later years he explains that it is "necessary, for giving a complete course of Anatomy, to provide a number of fresh subjects, and to have a competent stock of anatomical preparations." He writes: "Preparations serve two purposes chiefly, to wit, the preservation of uncommon things, and the preservation of such things as required considerable labour to anatomize them, so as to shew their structure distinctly."

Eight or nine months after his return to London, William Hunter appears to have felt that he was well on his way towards being prepared—in both knowledge and material—to begin his teaching. This, I think, is reflected in a paragraph of a letter he writes to his friend Cullen on February 26, 1745, in which he says:

Well, how does the animal economy appear to you, now that you have examined it, as one may say, with precision? I have good reason to put the question to you, because in my little attempts that way, since I begin to think for myself, Nature, where I am best disposed to mark her, beams so strong upon me, that I am lost in wonder, and count it sacrilege to measure her meanest feature by my largest conception. Ay, ay the time will come when our pert philosophers will blush to find that they have talked with as little real knowledge, and as peremptorily of the animal powers, as the country miller who balances the powers of Europe. But, if I follow out this train of thought, I shall become as pert as those I blame; therefore I'll drop the point.

The year 1745 was an important one for the surgeon who planned to

become a lecturer on anatomy as it was then that the prohibition against dissecting the human body outside the walls of Barber-Surgeons' Hall was nullified through the dissolution of the United Company.[6] He writes again to his old master, William Cullen, under date of May 1746:

> P.S. Among many things that take up my time at present, I labour most at a compendious System of Anatomy and Physiology, which will be necessary to be before me in the winter, should I at last enter my old scheme. But good heavens! What pains is required to do anything with tolerable accuracy! Have you not found it so, for you have been employed pretty much in the same way.

There seems to be obscurity and confusion concerning the manner through which William Hunter procured his pupils for his first course of lectures and therefore it has not been definitely established as to the "scheme" he refers to in the above postscript. There seems to be no doubt that he approached Dr. Frank Nicholls as early as 1743 with the suggestion that he be allowed to take over the course of lectures which the former was giving up. However, Nicholls had already promised to relinquish them to Dr. Thomas Lawrence who was at the time lecturing on anatomy at Oxford. But let us return to the year 1746. Simmons writes:

> A society of navy surgeons had an apartment in Covent Garden, where they engaged the late Mr. Samuel Sharpe to deliver a course of lectures on the operations of surgery. Mr. Sharpe continued to repeat this course, till finding that it interfered too much with his other engagements, he declined the task in favour of Mr. Hunter, who gave the society so much satisfaction that they requested him to extend his plan to Anatomy, and at first he had the use of their room for his lectures.

This has been the generally accepted story of the course of events and the one most commonly used by subsequent biographers of William Hunter. Thus Teacher writes:

> In the same volume with M. Ferrein's lectures there is a set of "notes on a course of Chyrurgical operations performed before the Society of Navel [sic] Surgeons, by Sam Sharpe of Guy's Hospital, March, 1746," taken by Hunter. It seems not improbable that the attendance on this course, and the writing of the "compendious system of anatomy and physiology," were both undertaken with the probability of succeeding Sharpe in the post of lecturer.

George Peachey has, however, entirely disproved this story of Hunter's earliest biographer by showing conclusively, through facts obtained from the contemporary press of that time, that Samuel Sharpe did not start his first course of lectures to the members of the Society of Navy Surgeons

[6] Frank Nicholls and James Douglas, both of whom had taught William Hunter anatomy, had not been subject to this by-law of the Barber-Surgeons' Company as they were not under its jurisdiction, being fellows of the Royal College of Physicians.

until March 20, 1746–1747,[7] five months after William Hunter had begun his first course of lectures on anatomy, which without doubt was based upon the "compendious System of Anatomy and Physiology," which he wrote Cullen he was in the midst of preparing. For proof of this Peachey produces the first announcement of William Hunter's course which appeared in the *London Evening Post* of September 16, 1746, a copy of which follows:

> On Monday, the 13th of October, at 5 in the evening will begin a course of anatomical lectures to which will be added the operations of surgery with the application of bandages, by William Hunter, Surgeon. Gentlemen may have the opportunity of learning the Art of Dissecting during the whole winter season in the same manner as at Paris. Proposals to be seen at Mr. Millar's Bookseller opposite to the end of Katharine St. in the Strand.

William Hunter's early medical and surgical education was now completed and he was accepted as a member of the newly founded Corporation of Surgeons during the year 1747.

In conclusion I quote once more from Samuel Foart Simmons who tells the following anecdote:

> My friend Mr. Watson, F.R.S. who was one of Mr. Hunter's earliest pupils, has told me that he accompanied him home after his introductory lecture. Mr. Hunter, who had received about seventy guineas from his pupils, and had got the money in a bag under his cloak, observed to Mr. Watson that it was a larger sum than he had ever been master of before.

REFERENCES

Adams, Joseph. *Memoirs of the life and doctrines of the late John Hunter, Esq.* London, 1817.

Beekman, Fenwick. Long Calderwood, the birthplace of the Hunters. *Bull. N.Y. Acad. Med.*, 1943, *2d. ser. 19*, 849–864.

Beekman, Fenwick. William Hunter's education at Glasgow 1731–1736. *Bull. Hist. Med.*, 1944, *15*, 284–297.

Bettany, G. T. William Hunter. In: *Dictionary of National Biography*. London, 1908.

Cole, F. J. The history of anatomical injections. In: Charles Singer's *Studies in the history and method of science*. Oxford, 1917–1921, *2*, 285–343.

Duncan, Alexander. *Memorials of the Faculty of Physicians and Surgeons of Glasgow*. Glasgow, 1896.

Duncan, J. M. On the life of William Hunter. Harveian Address, 13th April 1876. *Edinb. med. J.*, June 1876.

Elliot, John. The life of the author. In: *A complete collection of the medical and philosophical works of John Fothergill, M.D., F.R.S., and S.A.* London, 1781.

Glaister, John. *Dr. William Smellie and his contemporaries*. Glasgow, 1894.

Home, Everard. A short account of the author's life. In: John Hunter's *A treatise on the blood, inflammation, and gun-shot wounds*. London, 1794.

[7] The Julian calendar—the Old Style—which was replaced in Great Britain in 1752 by the Gregorian—the New Style—began the year on Ladies Day (March 25th). In consequence of this March 20th was within five days of the end of the year 1746 old style and was in the year 1747 new style.

HUNTER, WILLIAM. *Two introductory lectures delivered by Dr. William Hunter, to his last course of anatomical lectures at his theatre in Windmill-Street.* London, 1784.

MATHER, GEORGE. *Two great Scotsmen: The brothers William and John Hunter.* Glasgow, 1893.

MONRO, ALEXANDER (2nd.). An account of the life of the author. In: *The Works of Alexander Monro, M.D.* Edinburgh, 1781.

PAGET, STEPHEN. *John Hunter, man of science and surgeon.* London, 1897.

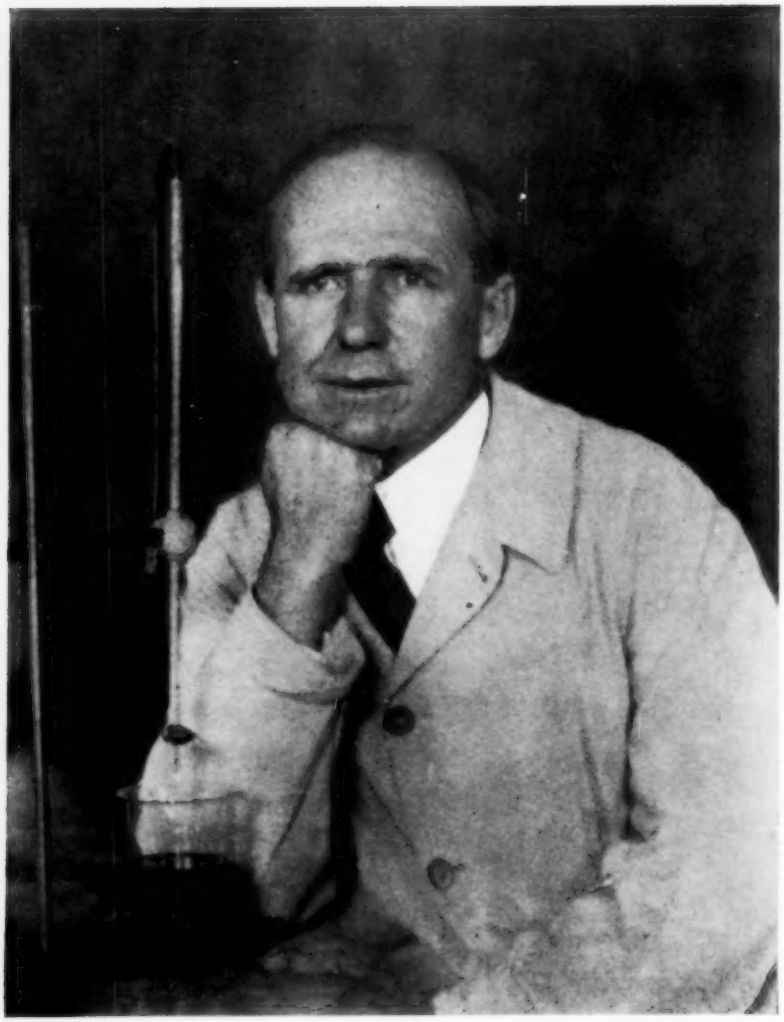
PEACHEY, G. C. *A memoir of William and John Hunter.* Plymouth [Eng.], 1924.

SIMMONS, S. F. *An account of the life and writings of the late William Hunter, M.D., F.R.S., and S.A.* London, 1783.

STRUTHERS, JOHN. *Historical sketch of the Edinburgh anatomical school.* Edinburgh, 1867.

TEACHER, J. H. *Catalogue of the anatomical and pathological preparations of Dr. William Hunter in the Hunterian Museum of Glasgow.* Glasgow, 1900.

THOMSON, JOHN. *An account of the life, lectures, and writings of William Cullen M.D.* Edinburgh, 1859.



Dr. John Howland in his laboratory at the Harriet Lane Home

John Howland: The Seventy-Fifth Anniversary of His Birth

WILBURT C. DAVISON*

JOHN HOWLAND was born in New York on February 3, 1873 and would have been seventy-five in 1948, had he lived. Unfortunately he died on June 20, 1926 at the age of fifty-three, but no one has done more for pediatrics. The first thirty-nine years of his life were preparation. After Exeter and Yale, he received an M.D. from New York University in 1897, another M.D. from Cornell in 1899, and was a house officer at the Presbyterian Hospital, New York from 1897 to 1899 and at the New York Foundling Hospital from 1899 to 1900. During the Spanish-American War he was an army surgeon on the hospital ships which brought to New York the troops suffering from typhoid fever acquired in Cuba. In 1900 he went abroad and studied pathology and the diseases of children in Berlin and Vienna. On his return in 1902 he became associated with the late L. Emmett Holt of New York in the practice of pediatrics, and was pathologist and assistant attending physician to the New York Foundling Hospital, pediatrician in charge of the children's clinic at Bellevue Hospital, attending physician to the Willard Parker Hospital, and instructor and associate in pediatrics at Columbia. In 1910 Howland was appointed professor of pediatrics at Washington University in St. Louis and assumed his duties there after several months of study at the Children's Clinic at Strasbourg.

His real career started in 1912 when he was called to the Johns Hopkins. Here through his clinical and scientific ability and his personality he made the Harriet Lane Home an outstanding university pediatric clinic. His life ended in 1926, but in those fourteen years he accomplished his ambition of placing pediatrics in this country on a firm university basis.

Dr. Howland was the leading pediatrician of this country, if not in the world. He was the ideal full-time teacher: that rare combination of great teacher, clinician, administrator, and adviser. In addition, his research work was outstanding. Consequently many young pediatricians wanted to work under him. Pediatrics then was a rapidly expanding field and the opportunities for teaching positions in other medical schools were increasing. Fortunately for us, and possibly also for medical education, a number of

* From the Department of Pediatrics, Duke University School of Medicine and Duke Hospital, Durham, N.C.

long-term assistantships and instructorships had been established at the Hopkins, thanks to the foresight of the Rockefeller Foundation, so that those who wished to go into academic pediatrics had an opportunity for training, a need which is even more acute today. Dr. Howland's pediatric department had enough money to maintain thirty of us at one time or another from 1912 to 1926—fourteen years. It was frugal living, but there was no other pediatric department in the country at which this training was available.

Practically all of these assistants of Dr. Howland became heads of pediatric departments in one-third of the medical schools in this country, as well as in some of those abroad. W. McKim Marriott and Samuel W. Clausen were made professors at Washington (St. Louis) and Rochester Universities respectively. Marriott also was Dean at Washington. Edwards A. Park went to Yale as professor of pediatrics and returned to the Hopkins after Dr. Howland's death. Kenneth D. Blackfan was successively professor at Cincinnati and Harvard. Grover F. Powers headed the Ford Hospital pediatric department and later became professor at Yale. James L. Gamble is now a professor at Harvard. Harold L. Higgins was head of the pediatric department at the Massachusetts General Hospital. Thomas M. Rivers is the director of the Rockefeller Hospital. Benjamin Kramer is the chief pediatrician at the Brooklyn Jewish Hospital and a professor of pediatrics at the Long Island College of Medicine. Among his other assistants, William M. Happ became professor at Southern California, Horton Casparis at Vanderbilt, Frederick F. Tisdall at Toronto, Graham S. Ross at McGill, Bruce Chown at Manitoba, William J. Orr and A. Wilmot Jacobsen at Buffalo, John E. Gonce at Wisconsin, A. Ashley Weech and Katherine Dodd at Cincinnati, L. Emmett Holt, Jr. at New York University, Arthur F. Abt at Northwestern, Frank L. Babbott at Long Island College, Arthur G. Maitland Jones at London University, Charles F. Harris at St. Bartholomew's (London), Akiro Sato at Sendai (Japan), Andor Bosanyi at Budapest, Karl Waltner at Szeged (Hungary), and W.C.D. at Duke. All of us were greatly stimulated by Dr. Howland and owed our advancement to him.

Dr. Howland's written contributions to the study of the diseases of children began in 1901 with a study of nephritis in typhoid fever and during the following twenty-two years numbered over sixty articles. His studies of acidosis, rickets, and tetany have been of the greatest importance in establishing means for their prevention and cure. I greatly prize a bound volume of his collected reprints (see attached bibliography). Dr. Howland collaborated with Dr. Holt in the seventh and eighth editions of *The Diseases of Infancy and Childhood* and just before he sailed to Europe in 1926, he started the revision of the ninth edition which his friends and I completed for him after his death. In addition to his own publications, there were many more papers by the members of his staff. He exerted no obvious pressure on his associates to force them to publish, but we knew that he was pleased when we turned up with a paper, even though he had the task of criticizing it and making us rewrite it several times. However, it was not as

bad as at some institutions where "a paper a day kept the chief away." At any rate, I may have been more guilty of verbosity than some of my colleagues because he told me once that he had never seen anyone write more fluently and worse than I did. I wrote thirty-six papers and two books during my eight years with Dr. Howland, none of them anything to brag about, but I learned from him how to condense a paper. His first criticism of any article submitted to him was "cut it in half." After that painful amputation was done, he often demanded a second abbreviation. As a result, most of us became adept in using as few words as possible in describing patients or experiments.

Dr. Howland worked hard six days a week and played golf in the low 80's on the seventh day. He expected his associates to do likewise. All of us worked hard, but only three, James L. Gamble, Graham S. Ross, and Arthur G. Maitland Jones, could play golf in the 80's. Dr. Howland was a stern disciplinarian but had a lively sense of humor. He had strong likes and dislikes and could be friendly or aloof. All of his associates were devoted to him, but there always was a certain formality when talking with him. In his absence, we referred affectionately to him as "John," but always "Dr. Howland" in his presence.

He liked to "ride" the students and house staff. I doubt whether one student will ever again fail to undress a patient completely, including diapers, after Dr. Howland's sarcasm when the physical examination presented in his clinic failed to note that the patient had a four-inch tail. Another student will be more careful in oral examinations after he missed a perforated palate and Dr. Howland quoted Mercutio's speech from Romeo and Juliet, " 'tis not so deep as a well, nor so wide as a church-door; but 'tis enough, 'twill serve." William Weston, Jr., Ashley Weech, and I have read medical journals more thoroughly after Dr. Howland diagnosed acrodynia in a patient we thought had pellagra. None of us, including Dr. Howland, had ever seen a case of acrodynia but he had recognized it from reading Dr. Joseph B. Bilderbach's and Dr. Weston, Sr.'s description of this condition. His clinical adage of "always think of the common things first" not only helped us avoid some wild diagnoses, but also was responsible for a study of the relative frequency of the 329 diseases of children so that others less gifted than Dr. Howland could know which were "the most common things" to be thought of first.

Howland was not without a bit of well-deserved vanity. He was very pleased when he was offered the professorship of pediatrics at Harvard and took delight, as a Yale man, in declining it. It is said that he glowed

with pride when a student in Feer's Clinic at Zürich where he was visiting, asked him "Sind Sie der berühmter Herr Professor Howland?" On the other hand, in discussing purely chemical problems with young chemists who were experts, he was as humble as a student—a wonderful proof of a true scientist.

In addition to being a prodigious worker, Dr. Howland had two characteristics—efficiency and economy. He hated to waste time or money. A good example was his invariable custom at lunch in Child's restaurant during the spring meetings at Atlantic City. The menus in those days had the prices and calories in parallel columns; Dr. Howland would study the two sets of figures until he could find the article which gave the most calories for the least money. The result always was hot cakes, syrup and sausage.

Dr. Howland was a skeptic and sometimes was not inclined to accept an idea unless it was his own or he thought it was. The members of his staff became very clever at dropping hints about something they wanted done until he conceived it to be his own idea and then executed it.

Dr. Howland's death was a tragic loss. One morning in February 1926 while on the way to the hospital with me Dr. Howland asked me to hold his clinic because he could not stop hiccoughing. The condition became worse that afternoon, and he finally had to stay in the hospital several days. Complete sedation with morphine eventually brought relief, but he was so weak that he decided to go to Europe for a rest and a holiday in accordance with plans made over a year before. While abroad, Dr. Howland visited several clinics and in his last letter, sent from Paris, he wrote that he was perfectly well. However, according to the later cablegrams, a cold from which he was suffering became worse, a severe cough developed which fatigued him greatly, and he had attacks of what was thought to be indigestion. His condition improved during the next two weeks and he went to London but arrived in an exhausted condition and had two hemorrhages apparently of gastric origin. A tentative diagnosis of duodenal ulcer was made, and as the bleeding continued, an operation was performed. Marked cirrhosis of the liver was found, probably as the sequela of infectious hepatitis he had had thirty and again ten years previously. That night his condition became critical. The next day the bleeding stopped and Howland rallied but he became delirious, coma developed the following day, and he died on June 20, 1926 at the age of fifty-three. Mrs. Howland and Dr. and Mrs. James L. Gamble were with him. He was buried at Walpole, N. H. on July 1, 1926. Paul Manship's bas-relief of Dr. Howland, which his associates had placed in the amphitheater of the Harriet Lane Home on October 17,

1929 carried the inscription, *Lux extincta lucet*—the extinct light shines. Dr. Park also has established a Howland Foundation in his memory.

To those of us who had been closely associated with Dr. Howland the shock of his death was great. As we saw his wards and his laboratories and contemplated his plans for the future, we could not realize that he would no longer be there to teach, stimulate, and encourage us. He had been the life and inspiration of his clinic: arriving before nine in the morning and leaving after six at night to go home to study and write—a constant example of the fact that success is founded on hard work. His great drive was motivated and powered by his faith in the investigative approach, both clinical and experimental. All visitors to the Harriet Lane Home were greatly impressed by its beehive-like activity, which included everyone from professor to intern. The students enjoyed and profited from his clinics, for he always made them think, and his spontaneous humor made the description of even the dullest details interesting. To his staff he was a continual help, ready to discuss any clinical, scientific, or personal problem. His judgment and his rugged honesty could always be relied on and his interest in the welfare of those with whom he came in contact was manifest in innumerable ways.

Dr. Howland was at his human best in the laboratory—planning, discussing, and performing experiments. He would not use a technician or allow us to have one, insisting that each man do his own work—the output might be smaller than with the present fashion of supervising technicians, or vice versa, but the results showed more thought. Furthermore, his name never appeared on a paper unless he had done a substantial part of the work —a practice which could well be followed by some heads of departments. In addition to teaching medical students and his staff, his advice was sought by all those who were interested in pediatrics. He had the respect of everyone as a real man. His influence in medical education was great not only at the Hopkins but elsewhere. It can truly be said that he placed the teaching of pediatrics in this country on a university basis. The *American Journal of Diseases of Children* did not start until 1911, and scientific articles were rare in it until Dr. Howland and his associates began to contribute.

Dr. James L. Gamble's tribute to Dr. Howland reflects the feeling of all who were trained at the Harriet Lane Home: "Dr. Howland should be rated with the four famous founders of the Hopkins. When he came to Baltimore in 1912 he opened the modern era of pediatrics in this country by establishing a full-time department equipped with laboratories for studying disease by the methods of the basic sciences. He believed in full-time mainly because it permitted sustained and effective use of the research equip-

ment. Of the importance of fundamental research in the clinic he had become convinced in Germany. It should be remembered that no such department existed in this country at that time. Oncoming younger men in pediatrics flocked to Baltimore and under his wise leadership, his department within a very few years was the outstanding pediatric group in the country and his laboratories were importantly productive almost from the outset. That he opened an era is evident from the fact that his pupils now occupy many of the pediatric chairs in this country. The success of his department gave large impulse to the acceptance of full-time and the provision of research equipment in clinical departments. Dr. Howland died all too soon, but not before he had made a very great contribution to the progress of university medicine and to the prestige of the Johns Hopkins Medical School."

Dr. A. Ashley Weech, after reading this paper added these words of tribute: "The body of Dr. Howland has been entombed for more than two decades, but his spirit lives on in the accomplishments of his pupils and will continue to live in the work of his pupils' pupils. During the last period of his life he had witnessed a renaissance of medical science, a renaissance embracing the discovery of insulin and of the anti-pernicious anemia factor of liver. He himself had participated actively in investigations which elucidated and were later to eliminate the childhood scourge of rickets. With clairvoyant perception he believed and taught that the pace of progress in medicine was to be accelerated through the study of function rather than structure and he urged his pupils to acquire the technique of chemistry, physics, and mathematics. He even sponsored a course in calculus at the Harriet Lane Home for himself and other members of his staff. Dr. Howland could not have perceived the specific triumphs which in the future were to be crowning rewards of applying methods of basic science to problems of disturbed physiology. To his pupils, however, who have lived to witness the triumphs, he will always remain in memory a man of intuitive vision who in advance of his time glimpsed the future and inspired them to prepare for a share in its rewards."

BIBLIOGRAPHY OF JOHN HOWLAND

1901–1926

1901

Glomerulo-Nephritis bei Typhus abdominalis. *Virchows Arch.*, 1901, *163*, 360–363.

1903

The pathological anatomy of the Shiga bacillus infections of the intestines in infants. *Proc. N. Y. path. Soc.*, 1903–04, *n.s.3*, 141–143. Also: *Med. News*, 1904, *84*, 433–439. Also: *Med. surg. Rep. Presbyterian Hosp., N.Y.*, 1904, *6*, 71–102.

1904

Two cases of appendicitis in young children. *Arch. Pediat.*, 1904, *21*, 354–359.

A clinical study of sixty-two cases of intestinal infection by the bacillus dysenteriæ (Shiga) in infants. *Med. News*, 1904, *84*, 481–486. (With L. E. LaFétra)

A case of typhoid fever with repeated chills. *Med. News*, 1904, *85*, 820–821.

1906

The toxicity of indol. (Abstr.) *Amer. Med.*, 1906, *n.s.1*, 156. Also: *Science*, 1906, *n.s.23*, 979. (With A. N. Richards)

Hypertrophic stenosis of the pylorus; operation, recovery. *Arch. Pediat.*, 1906, *23*, 190–193. (With J. Rogers)

1907

Some possible etiological factors in the recurrent vomiting of children. *Arch. Pediat.*, 1907, *24*, 401–417. (With A. N. Richards)

The symptoms of status lymphaticus in infants and young children. *Arch. Pediat.*, 1907, *24*, 590–598. Also: *Trans. Amer. pediat. Soc.*, 1907–08, 51–59.

1908

Circulatory disturbances in diphtheria. *J. Amer. med. Ass.*, 1908, *51*, 2121–2125.

1909

An experimental study of the metabolism and pathology of delayed chloroform poisoning. *J. exp. Med.*, 1909, *11*, 344–372. Also: *Proc. N.Y. path. Soc.*, 1908–1909, *n.s.8*, 161–188. Also (Discussion): *Johns Hopk. Hosp. Bull.*, 1909, *20*, 152. (With A. N. Richards)

A consideration of the pathological anatomy and pathogenesis of status lymphaticus in children. *Proc. path. Soc., Phila.*, 1909, *12*, 267–276.

Proprietary and predigested foods from the standpoint of the pediatrist. *J. Amer. med. Ass.*, 1910, *54*, 196–201.

1910

A preliminary report of the metabolism of diphtheria. *Trans. Amer. pediat. Soc.*, 1910, *21*, 141–150.

Circulatory failure in the acute infections of children; causes and treatment. *Boston med. surg. J.*, 1910, *162*, 627–632. Also: *Arch. Pediat.*, 1910, *27*, 332–344, (discussion) 378–382; *Pediatrics*, 1910, *11*, 378–387.

The use of bacterial vaccines in children's diseases. *Arch. Pediat.*, 1910, *27*, 672–697. Also: *Trans. Amer. pediat. Soc.*, 1910, *22*, 225–232. (With B. R. Hoobler)

The metabolism, directly determined, of healthy children during sleep. *Proc. Soc. exp. Biol. Med.*, 1910–11, *8*, 63.

Modern medicine and medical education. *J. Mo. med. Ass.*, 1910–11, *7*, 399–402.

1911

The fundamental requirements of an infant's nutrition. *Amer. J. Dis. Child.*, 1911, *2*, 48–54. Also: *Trans. Amer. pediat. Soc.*, 1911, *23*, 13–19.

A metabolism bed for infants. *Amer. J. Dis. Child.*, 1911, *2*, 419–422. (With R. A. Cook)

Der Chemismus und Energieumsatz bei schlafenden Kindern. *Z. physiol. Chem.*, 1911, *74*, 1–12.

The chemical and energy metabolism of sleeping children. *Trans. Ass. Amer. Phys.*, 1911, *26*, 399–409.

1912

The Harriet Lane Home for invalid children. *Johns Hopk. Alumni Mag.*, 1912, *1*, 115–121.

The effect of cold fresh air on the blood pressure in pneumonia of children. *Amer. J. Dis. Child.*, 1912, *3*, 294–303. (With B. R. Hoobler)

1913

Direct calorimetry of infants with a comparison of the results obtained by this and other methods. *Trans. XV. Int. Congr. Hyg. Demogr.* (1912) 1913, *2*, 438–450. (*Abst.*) *Biochem. Bull.*, 1912–13, *2*, 139.

A formula for the determination of the surface area of infants. *Amer. J. Dis. Child.*, 1913, *6*, 33–37.

The scientific basis for the artificial feeding of infants. *Amer. J. Dis. Child.*, 1913, *5*, 390–414. In: *Harvey Lectures*, Philadelphia and London, 1912–13, 292–324.

1914

Observations upon the so-called food intoxication of infants with especial reference to the alveolar air. *Proc. Soc. exp. Biol. Med.*, 1914, *12*, 51–54. (With W. McK. Marriott)

Thoracic complications of rickets. *Amer. J. Obstet.*, 1914, *70*, 536–538. (With E. A. Park)

The effect of thymus extirpation. *Trans. Amer. pediat. Soc.*, 1914, *26*, 274–276. (With R. D. McClure and E. A. Park)

1915

Indications for treatment of severe diarrhea in infancy. *Trans. Amer. pediat. Soc.*, 1915, *28*, 200–208. Also: *Arch. Pediat.*, 1915, *32*, 374–378; *Amer. J. Obstet.*, 1915, *72*, 544–547; *Pediatrics*, 1915, *27*, 592–597. (With W. McK. Marriott)

A study of acidosis occurring in the nutritional diseases of infancy. *Trans. Amer. Ass. Phys.*, 1915, *30*, 330–332. (With W. McK. Marriott)

1916

A discussion of acidosis, with special reference to that occurring in diseases of children. *Johns Hopk. Hosp. Bull.*, 1916, *27*, 63–69. Also: *Med. Rec.*, 1916, *89*, 125–126; *Amer. J. Obstet.*, 1916, *72*, 556–558. (With W. McK. Marriott)

Acidosis occurring with diarrhea. *Amer. J. Dis. Child.*, 1916, *11*, 309–325. (With W. McK. Marriott)

Acetone body production in infancy and childhood. *Amer. J. Dis. Child.*, 1916, *12*, 459–465. (With W. McK. Marriott)

Phosphate retention as a factor in the production of acidosis in nephritis. *Arch. intern. Med.*, 1916, *18*, 708–711. (With W. McK. Marriott)

The calcium content of the blood in rachitis and tetany. *Trans. Amer. pediat. Soc.*, 1916, *28*, 202–209. Also: *Amer. J. Obstet.*, 1916, *74*, 541–542. (With W. McK. Marriott)

Factors of influence in the production of acidosis in nephritis. *Trans. Amer. Soc. clin. Invest.*, 1916.

The use of a new reagent for microcolorimetric analysis as applied to the determination of calcium and of inorganic phosphates in the blood serum. *J. biol. Chem.*, 1916, *24*, Proc., xviii–xix. (With W. McK. Marriott and F. H. Haessler)

Acidosis in infancy and childhood. *Trans. Ass. Amer. Phys.*, 1916, *31*, 7–11.

Observations on acid base equilibrium in the body. *Amer. J. Physiol.*, 1916–17, *42*, 587–588. Also: *Proc. Amer. Soc. biol. Chem.*, 1916, *11*, v. (With W. McK. Marriott)

1917

A micro method for the determination of calcium and magnesium in blood serum. *J. biol. Chem.*, 1917, *32*, 233–239. (With W. McK. Marriott)

A micro method for the determination of inorganic phosphates in the blood serum. *J. biol. Chem.*, 1917, *32*, 241–243. (With W. McK. Marriott and F. H. Haessler)

Observations upon calcium in rickets and tetany. *Trans. Ass. Amer. Phys.*, 1917, *32*, 307–312. (With W. McK. Marriott)

Acidosis. *Penn. med. J.*, 1917–18, *21*, 429–436. (With W. McK. Marriott)

Observations upon the calcium content of the blood in infantile tetany and upon the effect of treatment by calcium. *Quart. J. Med.*, 1917–18, *11*, 289–319. Abstr.: *Johns Hopk. Hosp. Bull.*, 1918, *29*, 235–239. (With W. McK. Marriott)

1918

The influence of acid phosphate on the elimination of ammonia in the urine. *Arch. intern. Med.*, 1918, *22*, 477–482. (With W. McK. Marriott)

Death from cardiac failure in children, unexplained by post-mortem examination. *Arch. Pediat.*, 1918, *35*, 328–330. Also: *N.Y. med. J.*, 1918, *108*, 529; *Med. Rec.*, 1918, *94*, 1004.

A case of erosion of the blood vessels in the course of scarlet fever. *Arch. Pediat.*, 1918, *35*, 352.

The influence of acid phosphate upon the elimination of ammonia in the urine. *Johns Hopk. Hosp. Bull.*, 1918, *29*, 264.

Die Bedeutung von Eiweisszulagen beim Säugling. *J. Kinderheilk.*, 1918, *88*, 85–97. (With K. Stolte)

1919

Idiopathic hypertrophy of the heart in young children. In: *Contributions to medical and biological research, dedicated to Sir William Osler*, New York, 1919, 582–599, 7 pl.

1920

Method for determination of calcium in small quantities of blood serum. *J. biol. Chem.*, 1920, *43*, 35–42. (With B. Kramer)

A note upon the occurrence of congenital atrioventricular dissociation. Report of a case of congenital complete heart block. *Johns Hopk. Hosp. Bull.*, 1920, *31*, 351–354. (With E. P. Carter)

Rickets. Tetany of infants. In: *Nelson Loose-Leaf Medicine*, 1920, *3*, 136–140.

1921

Calcium and phosphorus in the serum in relation to rickets. *Amer. J. Dis. Child.*, 1921, *22*, 105–119. (With B. Kramer)

Observations on infantile tetany. *Amer. J. Dis. Child.*, 1921, *22*, 431–437. (With B. Kramer and F. F. Tisdall)

The clinical significance of calcium concentration in the serum of children and possible errors in its determination. *Amer. J. Dis. Child.*, 1921, *22*, 560–564.

The dangers to life of severe involvement of the thorax in rickets. *Johns Hopk. Hosp. Bull.*, 1921, *32*, 101–109. (With E. A. Park)

The radiographic evidence of the influence of cod liver oil in rickets. *Johns Hopk. Hosp. Bull.*, 1921, *32*, 341–344. (With E. A. Park)

The concentration of sodium and potassium as compared with that of calcium and magnesium in the serum of patients with active infantile tetany. *Proc. Soc. exp. Biol. Med.*, 1921, *18*, 252–253. (With F. F. Tisdall and B. Kramer)

Measles, scarlet fever, rubella. *Oxford Med.*, 1921, 499–551.

1922

Ultraviolet radiation in rickets. *Amer. J. Dis. Child.*, 1922, *24*, 20–26. (With B. Kramer and H. Casparis)

Factors which determine the concentration of calcium and of inorganic phosphorus in the blood serum of rats. *Johns Hopk. Hosp. Bull.*, 1922, *33*, 313–317. (With B. Kramer)

1923

A study of the calcium and inorganic phosphorus of the serum in relation to rickets and tetany. *Mschr. Kinderheilk.*, 1923, *25*, 279–293. (With B. Kramer)

1924

Medical aspects of acute appendicitis in children. *J. Amer. med. Ass.*, 1924, *83*, 961–963.

A consideration of endocrine therapy in infancy and childhood. *Sth. med. J.*, 1924, *17*, 743–750.

Goucher's disease with extensive involvement of the bones and invasion of the spinal canal. *Trans. Amer. pediat. Soc.*, 1924, *36*, 42. (With A. Rich)

1925

Calcification of rachitic bones *in vitro*. *Amer. J. Dis. Child.*, 1925, *30*, 37–39. (With P. G. Shipley and B. Kramer)

1926

The quantitative estimation of calcium, magnesium, phosphate, and carbonate in bone. *J. biol. Chem.*, 1926, *68*, 711–719. (With B. Kramer)

Studies upon the inorganic composition of bones. *J. biol. Chem.*, 1926, *68*, 721–728. (With W. McK. Marriott and B. Kramer)

Studies upon calcification *in vitro*. *Biochem. J.*, 1926, *20*, 379–387. (With P. G. Shipley and B. Kramer)

Notes and Queries

Edited by RALPH H. MAJOR, M.D.*

The Opening of The Wellcome Historical Medical Library

An important function was held at the Russell Hotel, London, on 2 December 1949, when the Directors of The Wellcome Foundation gave a luncheon for fifty distinguished historians, scholars, and librarians to mark the official opening of the Wellcome Historical Medical Library. The Chair was taken by Mr. H. E. Sier, Chairman of the Foundation, and he was supported by the Board of Directors and by Sir Henry Dale, O.M., Chairman of the Wellcome Trustees, and the Rt. Hon. Lord Piercy, Mr. L. C. Bullock, and Mr. Martin Price, Trustees. The guests included Sir Arthur MacNalty, late Chief Medical Officer, Ministry of Health, and now Editor-in-Chief of the Official Medical History of the War; Sir Henry Thomas, late Keeper of Printed Books, British Museum, and his successor, Mr. C. B. Oldman; Professor Charles Singer, Professor Emeritus of the History of Medicine, University of London; Sir William MacArthur, late Director General, Army Medical Services; Sir Hugh Lett, past President of the Royal College of Surgeons; Mr. Geoffrey L. Keynes; Professor Herbert Dingle; Mr. J. N. L. Myres, Bodley's Librarian; Mr. I. Kaye, Librarian of the Royal Society; Mr. G. F. Home, Librarian of the Royal Society of Medicine; Mr. W. R. LeFanu, Librarian, The Royal College of Surgeons; Dr. J. J. Keevil, Keeper of the Library, Royal College of Physicians; Mr. J. H. P. Pafford, Librarian, University of London; and Mr. J. Wilks, Librarian, University College.

After the luncheon an address was given by Dr. Ashworth Underwood, Director of the Library and of the Wellcome Historical Medical Museum. Dr. Underwood said that the distinguished guests present must represent between them one of the greatest collections of books in the English-speaking world. While in numbers the Wellcome library was small compared with this vast number, in its own field it was an important tool because of its completeness. He said that the library, which deals with the history of medicine and the allied sciences, consists of about 180,000 bound books together with other publications, making the total approximately 220,000. There are 612 complete incunabula with over 20 fragments. Of the sixteenth century books there are over 4,000 volumes, and the collection represents all the important works of this period. Early herbals are especially numerous, and there are 700 early English books printed before 1640, many of which are not found outside the British Museum. The manuscripts num-

* Department of Internal Medicine, The University of Kansas School of Medicine.

ber about 5,000 and date back to the fourteenth century; there are in addition more than a 100,000 autograph letters.

Dr. Underwood emphasized that the collection is virtually the result of the activities of one man, Henry S. Wellcome. Wellcome was born in 1853 in Wisconsin, and while a very young man he migrated to England and immediately made his mark in business activities, but he had in addition private interests which later turned out to be of great importance to scholarship and the sciences. As a collector of anthropological material he was early well known, and Dr. Underwood pointed out that there are certain items in the Museum which were purchased by Wellcome when he was still a youth. He set out with certain definite ideas in his mind and he quite early envisaged the creation of a museum and a library to cover the whole field of the history of medicine and the allied sciences. By 1900 his collections had become extensive. Wellcome had, however, no intention of making his material available to the public until he felt that the appropriate time had come. It was perhaps an accident which changed his train of ideas. That accident was the International Medical Congress of 1913. The Congress met in London, and under the repeated pleadings of men like Sir Clifford Allbutt, Sir William Osler, and Sir Norman Moore, Wellcome agreed to put up an exhibit on the history of medicine at the Congress. The exhibit was of course a great success, and after it was over the same men persuaded him not to consign the exhibits to their storehouses, and as a result the historical museum in Wigmore Street was opened to the public. In the case of the library no such fortuitous stimulus arose, and in consequence it had to wait until such a time as the collection could be made more complete and its contents fully classified.

Dr. Underwood said that the history of the library commences about 1895 when the first official purchases were made. From about 1903 onwards there are detailed records of purchases and by 1905 Wellcome was frequently purchasing over 2,000 books a year. The numbers fell materially during the decade following the first war, but in 1929 he purchased 5,500 books. His activities in this direction continued to the time of his death. During the last few years a number of important works have been purchased to fill existing gaps. There have been accessions of relevant journals, and a great number of general works of bibliography and reference have been added. The library is therefore fully equipped in this sphere. Dr. Underwood could illustrate the growth of the library fairly well by reference to the building up of the collection of incunabula. Sometime before 1898 Wellcome purchased a fragment. In 1897 he bought his first two complete incunables. Surprisingly enough, both of these were early copies of the Bible. In 1898 he bought William Morris' celebrated collection of 64 incunables. This was the nucleus of his collection, but in the same year he added 12 incunables purchased from different sources, and in 1899 he bought no less than 46 incunables from places widely scattered in Europe. By 1911 his incunable collection had

grown to 188, and in that year he bought the Frank Payne collection of 51 incunables. 1926 was a record year. At the beginning of that year he had 354, and during it he bought the Kurt-Wolff collection of 116 incunables. The next few years marked another period of activity, and in 1928 he bought 48 from different sources. Since Wellcome's death only 5 incunables have been added to the collection. It can thus be said that the collection is virtually the work of this single collector.

Dr. Underwood said it was almost unavoidable that if the collection of Sir Henry Wellcome were compared with those of other famous creators, that of Sir William Osler should immediately come to mind. Osler's greatness as a collector was due in no small part to the detailed notes which he made regarding the circumstances in which he bought individual books and his own views of their importance. Sir Henry Wellcome had neither the detailed scholarship nor the time in which to deal similarly with his own collection, but he nevertheless had a very real knowledge of the bibliography of medicine. Large numbers of the books were seen personally by him before he bought them. *Bibliotheca Osleriana* contains approximately 7,400 printed books, together with 100 incunabula and 150 manuscripts.

Dr. Underwood mentioned that the classification and documentation of this large collection has taken time. Although the library has been used by scholars for a long time, it is only now that its facilities can be said to be readily available. There is a card catalogue which covers most of the items in the library and work is now proceeding systematically on the preparation of the printed great catalogue. Mr. F. N. L. Poynter, Deputy Librarian, has recently completed a *Catalogue raisonné* of the incunabula, and when it is published it will be an important addition to the literature on this subject, since the Wellcome collection of incunabula dealing with medical and cognate subjects is among similar collections in the world apparently surpassed in numbers only by that of the Boston Medical Library.

Dr. Underwood paid a tribute to the work carried out by Mr. W. J. Bishop, the Librarian, and his staff, in bringing the library to its present high state of efficiency.

Sir Arthur MacNalty proposed a vote of thanks to the Chairman and Directors of the Wellcome Foundation for their hospitality and referred to the important place which the library fills in the world of scholarship. Sir Henry Thomas seconded this vote of thanks.

After the luncheon the guests proceeded to the library and spent the afternoon inspecting some of its treasures. Among the special treasures displayed were the following:

Rabanus Maurus. Strassburg, before 1467?. William Morris' copy.
Celsus. Florence, 1478.
Avicenna. *Canon*. Padua, 1597.

Galen. Venice, 1490.
Hippocrates. Venice, Aldus, 1526.
Hippocrates. Basle, Cratander, 1526.
Avicenna. *Canon*. Latin MS. on vellum. Late 15th century.
Articella. Latin on vellum. 15th century.
Aldobrandino da Siena. *Le régime du corps*. French MS. on vellum. 1390.
Isaac Judaeus. *De febribus*. Latin on vellum. Early 14th century.
Regimen sanitatis Salernitanum. Venice, 1500.
Book of hours. Paris, 1497.
Great herbal. Flemish. Antwerp, 1567.
Andrew Boorde. *Breviary of helthe*. 1540.
Contemporary proclamations and tracts relating to the Great Plague and Fire of London, 1665–1666 with copy of Wenceslaus Hollar's plan of London.
Apuleius. *Herbal*. Rome, 1483.
Nicolas Monardes. *Dos libros*. Seville, 1569. (The first work on American medicinal plants.)
William Gilbert. *De magnete*. London, 1600.
Timothy Bright. *A treatise of melancholie*. London, 1586.
Eucharius Roesslin. *The byrth of mankynde*. London, 1540.

A New Danish Periodical

Announcement has been made of the founding of a new periodical, to be published at Copenhagen beginning in 1950, under the name *Centaurus: International Magazine of the History of Science and Medicine*. The periodical will contain original articles as well as book reviews, lists of books received, and news and notes. There will also be two supplemental series for the publication of longer monographs. English, French, and German will be the languages employed.

The Editor-in-Chief is Dr. Jean Anker, Chief Librarian of the Scientific and Medical Department of the Library of the University of Copenhagen, 49 Nörre Allé, Copenhagen, Denmark. The United States will be represented on the Editorial Board by Dr. Henry R. Viets, Librarian of the Boston Medical Library, Boston, Massachusetts (for the medical and biological sciences) and Dr. I. E. Drabkin, Department of Mathematics, College of the City of New York (for mathematics and the physical sciences).

Authors in the United States are invited to submit papers for publication to the Editor-in-Chief or to this country's representatives on the Editorial Board. Books and reprints for review or listing should be sent directly to the Editor-in-Chief.

Marcantonio Contarini (died 1550), Official of the Venetian Republic and Patron of Dissection

In the first edition of the *Fabrica* of Vesalius, Book VII, Chapter 18, on pages 650–651 is an account of how human heads were obtained for dissection. The passage may be thus rendered:

I advise that the head be removed in the way that I have explained. You can then handle it more conveniently. For this reason heads of decapitated men are the most suitable for the

purpose, for they can be obtained immediately after execution with the friendly help of Judges and Prefects. If among these one is to be singled out, then it is the unique Maecenas of learning, the illustrious Venetian Senator, Marcus Antonius Contarenus, because of his rare knowledge of philosophy and of languages, and because of the many missions that he has successfully undertaken. Well known throughout the city and most zealous Praetor of the town of Padua, he has supplied us with abundant material for dissection, for he is a most studious and diligent observer of the *fabrica* of the body, another Boëthus or Sergius of the Romans.

The ancient family of the Contarini produced many distinguished members including several Doges and other officials of the Venetian Republic. Of Marcantonio Contarini I can, however, find only that he bore the title 'Duke of Candia,' that he was called *the philosopher,* that he acted often as an emissary of his country, that he edited a commentary on Aristotle's *Politics,* and that he died in 1550. All this from Hoefer after Ersch and Grüber. Any further information on this patron of Vesalius would be most welcome. There is no reference to him in either Tiraboschi or in Zedler's *Grosses vollstandiges universal Lexicon*—those two refuges of the destitute.

There is a portrait of Marcantonio Contarini extant, according to Hoefer, in the *Museum Mazzuchellianum* Venice 1761–1763. A full bibliographical reference to this work will be found in Hoefer's *Nouvelle Biographie Générale* under 'Mazzuchelli.' Can this or any other portrait of Marcantonio be identified with any figure in the frontispiece of the *Fabrica* of Vesalius?

In the last sentence of the passage just quoted from the *Fabrica* the names Boëthus and Sergius are those of the Roman patrons of dissection mentioned by Galen at the opening of his *De anatomicis administrationibus.*

Par, Cornwall, England CHARLES SINGER

Recent British Activities in the History of Science

Although the *Bulletin of the British Society for the History of Science,* the first number of which appeared in January 1949 and the second in August, remains as yet a very slender sheaf of minutes, abstracts, and reviews, its prospects for development appear at present to be good. When it is able to take its full place with the *Annals of Science* in representing British work in this field, it will serve not only as a medium for the publication of papers, but also as a great stimulus to the production of fresh studies and to the extension of the Society's activity and usefulness. Meanwhile another journal, for the philosophy of science, is to be published by Thomas Nelson and Sons, Ltd., on behalf of the Philosophy of Science Group which is affiliated with the British Society for the History of Science. It is to be hoped that both these journals will flourish and endure.

An important event for all those interested in the evolution of science was the re-opening on October 11, 1949, of the Museum of the History of Science in the Old Ashmolean Building, Broad Street, Oxford. The nucleus of this fine museum was the Lewis Evans Collection of historical scientific instruments

(consisting chiefly of astrolabes, dials, and mathematical instruments), opened nearly twenty-five years ago in the Musaeum Ashmoleanum, which then occupied the top floor of the Old Ashmolean Building. Because of the many acquisitions procured by the curator, Dr. R. T. Gunther, the collection soon outgrew the space allotted to it. In 1935 the Lewis Evans Collection became the Museum of the History of Science, and the entire building was to have been transferred to the Museum in 1942. The coming of war made this impossible and the premises were for a time occupied by the Ministry of Labour; even when the building was at last vacated, necessary renovations still further delayed the opening. Scientists and historians on both sides of the Atlantic will rejoice that this long-awaited event has taken place. Dr. Gunther did not live to see it, for he died in March 1940. The present curator is Dr. F. Sherwood Taylor, perhaps most widely known in the United States as the author of *The Alchemists: Founders of Modern Chemistry*. The Museum is now laid out on three floors. The top one, the former Musaeum Ashmoleanum, is devoted to the history of time-telling, and of physics other than optics; the ground floor, once the School of Natural History, contains optical instruments; while the basement, which from 1683 until 1857 contained the Chemical Elaboratory, is now given over to exhibits illustrating chemistry and medicine. Plans for the future include the issue of a comprehensive catalogue with historical notes. The first part to be issued will be that dealing with the time-telling instruments, notably the dials, quadrants, and nocturnals. Meanwhile, a brief general guide to the collections is already available.[1] The Museum is the centre of the teaching of the history of science at Oxford. Dr. Taylor, Dr. S. F. Mason, and others have given formal courses of lectures.

From April 13th to December 31, 1949, the King George III collection of scientific instruments was on display in the Science Museum, South Kensington. The collection was started privately by Dr. S. C. T. Demainbray, who became tutor to the Royal Family in 1754, and was later appointed King's Astronomer. Although this particular collection was intended mainly for the instruction of the Royal children, similar pieces of apparatus comprised the stock-in-trade of Georgian instrument makers. "Experimental philosophy" as taught circa 1740–1770 may consequently be seen in epitome in this collection, which illustrates contemporary knowledge of optics, acoustics, astronomy, chemistry, electricity, heat, magnetism, mathematics, surveying, mechanics, and pneumatics at the level of a very good general education. The exhibits are remarkable for the high quality of the workmanship, chiefly in brass and mahogany. A brief outline of the history of the collection, with notes on the personalities involved and on the significance of the objects themselves, is available from H. M. Stationery Office for 6d.

While undergraduates in a number of British universities may attend lec-

[1] *A brief guide to the Museum of the History of Science, Oxford.* Oxford, 1949. 59 pp., 12 illus., 2s.6d.

tures in the history and philosophy of science or the history of medicine, there now appears to be a much stronger impulse than at any time in recent years to extend such teaching to more elementary students, as well as to the general public. Free public lectures of the usual museum type, though unusual in range and quality, continue to be given in the Science Museum morning and afternoon, six days a week, on such subjects as "Man and the Machine (The Industrial Revolution)," "James Watt and His Times," "Early Printing and Papermaking (4000 B.C. to the 15th century A.D.)," etc. The present lecturers are S. H. Groom and G. T. Richards. More novel, however, is the series of twenty-minute talks broadcast weekly by the B.B.C. during the autumn and spring broadcasting terms, 1949–1950, under the auspices of the School Broadcasting Council for the United Kingdom. These talks may be heard on Friday morning in the Home Service, and are repeated, usually the week following, in the famous Third (evening) Programme. Each pupil is supplied with a well-written booklet, "The History of Science," which explains the purpose of the series, outlines each broadcast, provides a few pictures and diagrams to which speakers may refer, and contains also a short bibliography, a chronological table, and a page of questions. The nature and scope of this series are indicated by the following list of lectures, grouped under the general title, "The Scientific Revolution," and continuing to March 1950. The high qualifications of the lecturers will be noted.

1. Dante's View of the Universe. H. Butterfield, Professor of Modern History, University of Cambridge.

2. Why was Science Backward in the Middle Ages? M. Postan, Professor of Economic History, University of Cambridge.

3. Copernicus and the Planets. H. Dingle, Professor of the History and Philosophy of Science, University of London.

4. Bacon and the Experimental Method. F. D. Broad, Knightbridge Professor of Moral Philosophy, University of Cambridge.

5. Harvey and the Circulation of the Blood. Sir Henry Dale, Formerly Director of the National Institute for Medical Research.

6. The Development of Scientific Instruments in the Seventeenth Century. S. Lilley, Fellow of St. John's College, Cambridge.

7. How the Scientific Revolution of the Seventeenth Century Affected Other Branches of Thought. B. Willey, King Edward VII Professor of English Literature, University of Cambridge.

8. Newton and his Universe. Professor Butterfield.

9. The Birth of Modern Chemistry. D. McKie, Reader in the History and Philosophy of Science, University of London.

10. Scientific Developments in the Early Nineteenth Century. F. S. Taylor, Curator of the Museum of the History of Science, Oxford.

11. Pasteur and the Problems Presented by Bacteria. H. A. Clegg, Editor of the British Medical Journal.

12. The Origin of Species. C. F. A. Pantin, Reader in Zoology, University of Cambridge.

13. Darwin and his Universe. Rev. C. E. Raven, Vice-Chancellor and Regius Professor of Divinity, University of Cambridge.

14. The Development of Electricity. J. A. Ratcliffe, Fellow of Sidney Sussex College, Cambridge.

15. The Atom. Sir Lawrence Bragg, Cavendish Professor of Experimental Physics, University of Cambridge.

16. Science Today. Sir Henry Tizard, Chairman, Advisory Council on Scientific Policy.

The questions have been raised: "What is the place of the history of science in education?" and "What can be done about it?"[2] In this series the B.B.C. offers an interesting experiment toward an answer, even if only a partial answer, to these questions.

London provides much of interest for the student of the history of science in addition to its great libraries and museums. On December 15, 1949, Professor Corneille Heymans of the University of Ghent, winner of the Nobel Prize, lectured on Vesalius at l'Institut Belge, Belgrave Square; on the same day the scientific achievements of Robert Hooke were the subject of the Wilkins Lecture delivered by Professor E. N. daC. Andrade to the Royal Society. Such events are certainly not so numerous as this coincidence perhaps suggests, but it is true that a week seldom passes without one such lecture somewhere in London, apart altogether from the regularly scheduled University lectures.

Books now in press which deal with the history of science include the catalogue of incunabula at the Wellcome Historical Medical Library, compiled by F. N. L. Poynter, Deputy Librarian; and a bibliography of Edward Jenner by W. R. LeFanu, Librarian, Royal College of Surgeons of England. Mr. Poynter is working on a biography of Southwood Smith, while Mr. LeFanu plans a detailed bibliography of John Hunter and an edition of Hunter's letters. Miss Jessie Dobson, Recorder at the Royal College of Surgeons, contemplates a work to be entitled "Eponyms Illustrated," in which an illustration of an eponymous anatomical structure will accompany the original description; wherever possible there will also be a portrait of the anatomist concerned.

LLOYD G. STEVENSON

News of Dr. Paul Gelmo, Discoverer of Sulfanilamide

Many of those interested in chemotherapy may have wondered what had become of Dr. Paul Gelmo who discovered sulfanilamide in 1906, only to bury

[2] Cf., e.g., *Bulletin of the British Society for the History of Science*, 1949, *1*, 11–16. Minutes of a symposium on these general questions.

his results so successfully that they had to be rediscovered by Dr. Gerhard Domagk of the Interessengemeinschaft. It is stated in histories of medicine and in the literature on the sulfonamides that Gelmo disappeared in 1908, and some writers have hinted that he was possibly a victim of World War I.

I have now had a letter from a reader in Vienna who says that Dr. Gelmo (now seventy years old) is very much alive, that he is active as chief chemist of the Austrian State Printing Office. His historic paper bore the title "Ueber Sulfamide der p-Amidobenzolsulfonsaure" and appeared in the *Journal für praktische Chemie,* Leipzig, 1908—two years after he had made his discovery.

New York City WALDEMAR KAEMPFFERT

Comments on Shrewbury's "The Yellow Plague"

[Following the publication of Dr. Shrewsbury's paper in the *Journal* (1949, *4,* 5–47), the following letter was received from Sir William MacArthur, M.D., D.Sc., F.R.C.P., Lecturer in Tropical Diseases, Medical School, University of Oxford. *Editor.*]

I venture to send you the enclosed reprint* on the advice of several of our leading authorities on medical history in view of Dr. Shrewsbury's surprising identification of the "Yellow Plague" as confluent smallpox.

I may say that I have seen confluent smallpox of every degree of severity, and there was never the least difficulty in recognizing the disease. And even when the face and hands were, in the end, "a sheet of pus," the pocks on the chest, abdomen and back remained discrete and typical throughout. No case could be more virulent than these—and still be confluent; for in more intense infections the subjects died of haemorrhagic smallpox without any rash, or else did not survive for the ten days or so which the rash requires to become fully confluent.

In the virulent smallpox which attacked the non-immune Mexican Indians —cited by Dr. Shrewsbury—the Spaniards had no difficulty in diagnosing it, and even traced the epidemic back to an imported Negro, as no doubt you know. The ancient Irish were familiar with smallpox, and if the Yellow Pestilence had been that disease, they would have said so plainly, as they did of other smallpox epidemics in the 6th century.

Two names, each descriptive of a stage of the disease, were then in use in Ireland: (1) *Bolgach* ("Pock-disease"), a name which still survives among the Gaelic-speaking Irish and Scottish Highlanders (chickenpox would have been excluded automatically from record as the annalists concerned themselves only with epidemics causing a heavy mortality); (2) *Clamtrusca* (in its various spellings), given because of the extensive scabbing left by the drying pocks. Smallpox is the only killing epidemic disease characterized by marked scabbing.

* MacArthur, W. P. The identification of some pestilences recorded in the Irish annals. *Irish Historical Studies,* 1949, *6,* 169–188.

I cannot believe that so feeble a descriptive term as "yellow" for smallpox could possibly have been thought of simultaneously both in Britain and in Ireland; moreover, the word used in the earliest MSS. to describe the colour in the Yellow Pestilence was *crón:* which exactly represents the "dusky orange brown" of relapsing fever in the famine of 1846, a colour not found in smallpox of any kind. (In later transcriptions, *crón* was gradually replaced by the more general word *buidhe,* "yellow," without the restricted meaning of *crón*.)

During the famine, 1846–1850, jaundice was described as "frequent," "usual," etc., in relapsing fever. Thus, Dr. Freke (Roscommon) wrote: "In many cases a deep jaundiced hue pervaded the entire surface of the body." Of the admissions to the Whitworth and Hardwicke Hospitals, Dublin, it is recorded: "Many were brought into hospital jaundiced . . . the hue varying from a pale sallow unhealthy colour, to the deepest jaundice of a dusky orange brown." Yellow fever" was then an everyday name for relapsing fever, and Graves used it exclusively in his textbook on medicine where the chapter on the disease is headed: "Yellow Fever of the British Islands." This would seem to dispose of Dr. Shrewsbury's argument that jaundice in relapsing fever is not common enough to suggest the name "yellow"; the truth is that "yellow" for relapsing fever *was* an accepted term. There is no evidence that "yellow" was ever applied to smallpox in Ireland.

As regards the pestilence of 664, "Yellow Pestilence" in this connexion is neither a genuine nor a contemporary name. It is not to be found in the oldest of the existing transcriptions of the Irish Chronicles, the Annals of Inisfallen. Nor is it in the Bodleian MS. of the Annals of Ulster; in the Trinity College copy of this text, the words have been added above the line in a different hand and different ink, and were not in the original transcript .They did not appear, therefore, in the parent form of these copies, called by O'Rahilly the Ulster Chronicle which he calculates was compiled about 740 from still earlier records.

This late and retrospective gloss was interpolated by some meddling transcriber who wrote, probably, more than 800 years after the event, in the mistaken assumption that the pestilence of 664 (actually, I believe, bubonic plague) had been of the same nature as the true Yellow Pestilence of (about) 550.

London WILLIAM MACARTHUR

The Earwig as a Cause of Disease

QUERY No. 15. Can you tell me anything more about the Earwig as a cause of disease than the common folk-belief that is referred to in the usual reference books? I have found but one medical reference, Pliny, which discusses treatment only, and no reference to "pathogenesis" of brain disease by invasion of the ear-drum and brain.

Chicago, Illinois WILLIAM J. FORD

Bernard Emms Read

May 17, 1887—June 13, 1949

His many friends in the world of science will be grieved to learn of the passing of Dr. Bernard E. Read in Shanghai several months ago. Almost to the last this true scholar attended to the business of conducting the affairs of the Lester Institute of Medical Research whose Director he had been since 1946. Severe illness could as little prevent him from doing his duty as could the Japanese occupants of Shanghai during the war.

Born in Brighton, England, Bernard Read had his fundamental training in pharmacology in London and received the degrees of M.P.S. and Ph.C. in 1908 and 1909 from the London College of Pharmacy. He then went to China to be Lecturer in Chemistry and Pharmacy at the old Peking Union Medical College. In 1918, on reorganization of that institution by the Rockefeller Foundation, he was sent for further training to the United States, where he attended Johns Hopkins, Chicago, Harvard, and Yale Universities, receiving his M.Sc. in biochemistry in 1918. The following years were devoted to teaching of biochemistry and pharmacology at P.U.M.C., until in 1923 he once more took two years at Yale, returning with his Ph.D. in 1925 to Peking to become Professor of Pharmacology.

The following seven years were devoted mostly to researches on Chinese drugs, results of which were published in the *Bulletin of the Peking Society of Natural History*, and in separate volumes also published by the same learned society. In 1932 he finally accepted a call by the Lester Institute in Shanghai to head its division of physiological sciences, a position he held until after Pearl Harbor.

As pointed out before, Dr. Read thought it his duty to remain in China though shortly before the outbreak of war American annd British citizens were given an opportunity to leave the endangered city. Even when exchanges of civilian prisoners were arranged during the war, Dr. Read did not avail himself of this opportunity to rejoin his wife and son who had left for America, but stayed on, finally to be interned by the Japanese. In camp he ceaselessly endeavored to improve the lot of the aged and ill among his comrades, and his special knowledge of nutrition undoubtedly helped to keep many of the prisioners alive under these most trying conditions.

When Japan collapsed, Dr. Read was at last free to leave China, but he took only a short furlough to bring his family back, and then assumed directorship of the Lester Institute on the death of his colleague Dr. Earle. For two more years he worked hard to rehabilitate the institute and succeeded therein under the very difficult postwar circumstances in China. Research work was once more going on, equipment and library were put in working order, and he looked forward to a further number of years devoted to constructive work. Fate, however, willed otherwise; an insidious illness forced him to fly to England to undergo a drastic

operation. Once more he returned to his post, only to be felled within a few months.

Dr. Read's life work has been his research on Chinese drugs, medicinal plants, and materia medica, based on the historical medical literature of that old civilization, with translations of the six parts of the venerable textbook of Chinese pharmacology, the *Pen Ts'ao* or Herbal. He undoubtedly planned many more contributions in this field, but these unfortunately were cut short by his untimely death. He was also active in the work of the North-China Branch of the Royal Asiatic Society at Shanghai, serving several terms as President, Vice-President, and Editor of its Journal, also contributing articles and giving lectures in that institution, mostly dealing with his special subject—ancient Chinese medicine as viewed by modern science. He was also a charter member of the Chinese Society of Medical History. In whatever capacity he was active, he knew the secret of creating an atmosphere of good will and kindness around him, which turned all his collaborators and assistants into devoted friends and admirers.

In the death of Bernard Read we have lost a scientist of fine quality, a scholar of rare devotion to his work, and last but not least, a man of sterling character, combining the gift of an excellent brain with that of a warm and kind heart. We shall not easily find his equal.

Beverly Hills, California KURT L. SCHWARZ

Book Reviews

EMANUEL BERGHOFF. *Entwicklungsgeschichte des Krankheitsbegriffes.* 2nd ed. Wien, Verlag Wilhelm Maudrich, 1947. 201 pp.

CHARLES FRANKEL. *The Faith of Reason. The Idea of Progress in the French Enlightment.* New York, Kings Crown Press, 1948. 165 pp. $3.00.

The New Science of Giambattista Vico. Translated by Thomas Goddard Bergin and Max Harold Fisch. Ithaca, New York, Cornell University Press, 1948. 398 pp. $5.00.

MEDICINE deals with human beings and their reactions to normal and abnormal stimuli. The physician studies these reactions, endeavoring to learn their significance and cause, and how to recognize those that are or may become serious and consequently require immediate attention so that he can take measures leading to the removal or alleviation of these causes and their consequences. To do this effectively the physician must have some accepted frame of reference, some concept of the nature and cause of sickness in terms of which he can define the concrete situation that he faces.

Throughout known history men have developed concepts of disease, and the changes which these have undergone are an important facet of the history of medicine. Berghoff, in the volume under review, has undertaken to give us this story. In twelve chapters he traces the development of concepts of disease from those of preliterate and protohistoric peoples to those held at present. Berghoff provides an adequate bird's-eye view of his subject, particularly in the first half of the book where he follows the conventional pattern laid down by earlier historians, i.e., pre-Hippocratic theories, Hippocrates and his school, Galen and the Middle Ages, the Renaissance, and the scientific advance of the seventeenth century.

As he enters upon the analysis of the eighteenth and nineteenth centuries, however, Berghoff loses control of his material and the result is a confused picture, particularly of the period from about 1750 to 1850. This period is dealt with in four chapters, arranged respectively on a conceptual, chronological, and geographical basis (Animism and neuropathology; Mesmerism and the Romantic School; the end of the eighteenth and the beginning of the nineteenth centuries; the Vienna School). This arrangement has resulted in confusion in the chronology. For example, Carl Gustav Carus (1789–1869), Lorenz Oken (1779–1859), and Gotthilf Heinrich von Schubert (1780–1860) are all mentioned in the chapter on the Romantic Movement, and the chapter ends with a statement that evidences of their theories can be traced into the nineteenth century. The next chapter takes up the theories of the German "natural history" school (Schönlein, Eisenmann) and then reverts back to Bichat and the development of the Paris school.

The following chapter which deals with the Vienna school again goes back to the middle of the eighteenth century and in the course of things deals with Giovanni Malfatti (1775–1859) who definitely belongs within the Romantic group. Furthermore, Andreas Röschlaub (1768–1835) is mentioned in connection with the doctrine of John Brown but not in connection with Romantic medicine despite the fact that he exerted an important influence on Schelling, who is discussed at some length. Similarly, the entire relation of mesmerism to the Romantic medical movement is distorted. On this subject, Romantic medicine, Berghoff would have done well to consult Hirschfeld's monograph (Ernst Hirschfeld, Romantische Medizin, *Kyklos*, 1930, *3*, 1–89). The positive contributions of *Naturphilosophie* are lost sight of in the potpourri that Berghoff offers. Similarly, the influence of the experiential philosophy of Condillac, and of his successors the *Idéologues*, on the concepts of Bichat, Pinel, Broussais, Magendie, Alibert, and others is never brought into the picture. A basic weakness is the insufficient attention paid to the relations between philosophy and ideas of disease. Similarly, the last chapter deals with the significance of social medicine for the development of disease concepts, but here too there is an utterly inadequate treatment of a significant subject. The ideas of Johann Peter Frank, Villermé, Virchow, Grotjahn, and other important thinkers in this field are not mentioned, and their names are omitted. In summary, this is a superficial introduction to an important phase of medical history.

The reader who wishes to pursue further his study of the philosophical context out of which developed the concepts of the Paris school would do well to read closely Frankel's monograph, *The Faith of Reason*. Frankel undertakes to correct the interpretation of the Enlightment given by the late Carl L. Becker in his *Heavenly City of the Eighteenth Century Philosophers*, an interpretation which while provocative is undoubtedly in some degree exaggerated. Frankel asserts that while the philosophers did think in terms of a metaphysical framework, they drew their interpretation and concepts of science not from antecedent metaphysical principles, but from the method of science itself. It was this new method of institutionalized inquiry which was brought into focus by the idea of progress, and these ideas were further developed in the utilitarian theories of the nineteenth century which had a definite impact on concepts of disease.

However, the Age of Enlightenment was no more homogeneous than any other age. It contained within itself the seeds that were later to burgeon in the romantic early nineteenth century. The best illustration of this thesis is probably the case of Giambattista Vico (1668–1744) of Naples who repudiated the prevailing philosophy of the eighteenth century, producing the *Scienza nuova* which John Fiske characterized as "the driest, obscurest, metaphysicalist book I ever got hold of." In this work Vico developed a cyclical concept of historical change, a concept which came into prominence when Vico was rediscovered with delight

by the French historian Michelet, and by German scholars. Furthermore, he developed the philosophical principles implicit in his work so that he was able to attack the Cartesian philosophy and to insist that the theory of knowledge be put on a broader basis. Indirectly, Vico was to influence the writing of history.

In their translation, Bergin and Fisch make the *Scienza nuova* available for the first time in English. The edition used was the third, of 1744. In view of Vico's difficult Italian, the translation is excellent and makes the meaning as clear as possible. The scholarly reader will also wish to consult the *Scienza nuova* of 1725 edited by Fausto Nicolini and published as Volume 135 in the *Scrittori d'Italia* (Bari, Laterza, 1931). Introductory material to the *New Science* appears in the *Autobiography of Giambattista Vico*, Cornell University Press, 1944, also translated by Bergin and Fisch.

GEORGE ROSEN

G. B. DUCHENNE (of Boulogne). *Physiology of Motion.* Demonstrated by means of electrical stimulation and clinical observation and applied to the study of paralysis and deformities. Translated and edited by Emanuel B. Kaplan. Philadelphia, J. B. Lippincott Company, 1949. xxiii + 612 pp. $18.

THE appearance of an English translation of Duchenne's great work fills a long-felt hiatus in the literatures of anatomy, morphology, physiology, neurology, orthopaedic surgery, and above all, kinesiology. *Physiologie des mouvements* was published first in Paris in 1867 and received immediate recognition in scientific circles as a masterpiece of painstaking observation based upon what was then the novel method of electrical stimulation. This approach to the study of muscle action introduced by Duchenne remained the most accurate method of determining the normal and pathological motions of muscles and muscle groups in the living organism. The value of its contributions to many fields of biological science has become immeasurable. In the field of kinesiology and neuromuscular dysfunction little has been written since then that could not have been found in Duchenne's volume. Much time, print, and paper have been spent in the English language world which could have been spared had this translation been made in the 1860's instead of the 1940's.

Dr. Kaplan has performed a tedious and difficult labor of love for which the scientific world is his debtor. Both he and his publishers are to be congratulated on the production of a volume so noteworthy in its bibliographical and linguistic excellence. By his own original contributions in this field the editor has earned the right to undertake this difficult translation. The difficulty lay first in the considerable discrepancy which separates the anatomical terminology of mid-nineteenth century Paris from the conventionalized terminology of the present. Second to this must have been the conflicting ideas which confused the polemics in kinesiology current at that time. The contributions of Marshall Hall, Sir Charles

Bell, Hermann von Helmholtz, William Bowman, and particularly the Webers, all of which had preceded the work of Duchenne, had given a tremendous impetus to studies in the physiology and neuromuscular pathology of human locomotion. Duchenne's book, so far as it is possible to ascribe so large an influence to one publication, closed a chapter on the subject. All that went before had to be reviewed; much was corroborated, but a great deal was modified, and some was completely changed. Remarkably little has since been added to kinesiology in its mechanistic aspect.

The material of the book is almost entirely descriptive. Each of the important muscle groups is taken up in turn and its kinetics discussed in a uniform sequence. Where conflict of opinion existed, a brief discussion defends the author's observation. The analyses of function are made more valuable by the repeated references to clinical cases. In using this means of demonstration Duchenne incorporated a wealth of material which has not been adequately appreciated by neurologists or orthopaedic surgeons. Part III includes his studies of the muscles that govern respiration and those which move the "craniovertebral column." An appendix includes his more theoretical concepts including his hypothesis of the "co-ordinating faculty of locomotion," closely akin to Sherrington's proprioceptive reflex. A final supplement describes the kinetics of the facial muscles which must be read in conjunction with Darwin's or Cannon's work on the importance of the facial muscles in expressing human emotions. The text was not intended "to while away a delightful hour of reading"; it was intended and remains a serious report of factual data, scientifically interpreted for students in the discipline.

Like many other masterpieces of scientific literature, the great work of Duchenne which completed and rounded out his earlier studies has been often quoted in English since its publication. It has always been quoted out of context and, more often than not, from second- and third-hand sources. So specific a subject suffers drastically from such practices, and by the magnitude of its importance in the biological sciences this work has deserved better. At last it has been granted its desert. For those whose studies or investigations touch the material of kinesiology either directly or tangentially, Duchenne's *Physiolgie des mouvements* remains indispensable.

New York City EDGAR M. BICK

The Selected Writings of William Clowes, 1544–1604. Edited, with an Introduction and Notes by F. N. L. Poynter. London, Harvey and Blythe, Ltd., 1948. 179 pp., 8 pl. 15/-.

DESPITE the wealth of literature that has been produced on the Age of Elizabeth, the Elizabethan physician and surgeon have not yet received an objective and judicious portrayal. As a contribution to this end, Mr. Poynter of the Wellcome

Historical Medical Museum offers the present group of selections from the works of William Clowes. The selections are taken from all three books that Clowes wrote—on syphilis, on surgery, and on the king's evil.

Beginning his surgical career with the Earl of Warwick's army at Havre-de-Grace (the present Le Havre) in 1563, Clowes later served with the Earl of Leicester in the Netherlands (1586–1587), in the navy under Howard against the Armada (1588), and for ten years as surgeon at St. Bartholomew's Hospital. During his service in the Low Countries, Clowes was present at the battle in which Sir Philip Sidney received his mortal wound, for he tells how he treated Sidney's lieutenant who was wounded in the same action.

The spelling and grammar of the text have been adapted to modern usage wherever it seemed desirable. Nevertheless, the language still retains the vigorous and racy quality which one cannot help but feel must have been characteristic of the surgeon William Clowes. The selections have been well chosen and skilfully integrated, so that they present a picture of medical practice in Elizabethan England not easily forgotten. The various case histories and experiences related by Clowes reflect the seamier sides of London life, illuminate the relations between patient and physician, and regular and irregular practitioners (chapters III, IV, VII, IX, and XIII).

This is a book that one can recommend to practising physicians, medical students, and to the larger public interested in matters medical. The volume is attractively made, and is supplied with a biographical index of persons mentioned in the text as well as with a short bibliography.

GEORGE ROSEN

AXEL GARBOE. *Thomas Bartholin; et Bidrag til Dansk Natur- og Laegevidenskabs Historie i det 17de. Aarhundrede.* (Acta Historica Scientiarum Naturalium et Medicinalium ed. Bibliotheca Universitatis Hauniensis, vol. V) Copenhagen, Munksgaard, 1949. 212 pp. Dan. kr. 21.

THOMAS BARTHOLIN often has been the subject of literary, medical, and institutional history, but not until now of the kind of biography which unites all three viewpoints. The development of anatomy in the seventeenth century, so largely influenced by this enthusiastic investigator and teacher, is involved with a gallery of other notable men; their lives are interwoven with their researches, and the combination offers, as evidenced in the present monograph, a useful critical introspection.

The present (first) volume of Dr. Garboe's monograph—supported by a number of papers by the same author—deals with Thomas Bartholin's youth and travels, his medical professorship in Copenhagen, his discovery of the lym-

phatic vessels, and retirement from active teaching, i.e., Thomas Bartholin's life and activities from 1616 to 1659. The family supported learned traditions and abilities. Thomas' father, Caspar B. (1585–1629) had studied medicine in Padua and Basle and published in 1611 a handbook of anatomy (*Institutiones*) frequently reissued in later years and in time revised by the son. The family on both sides counted many men of profound learning and attained great influence along with such men as Ole Worm, Simon Paulli, and younger contemporaries. Much of their work and interrelations may be traced in C. C. A. Gosch's work on the history of zoology in Denmark, and sidelights of all kinds are offered in Worm's famous *Epistolae* (1751).

Thomas Bartholin in 1637, having won acceptance in propedeutics by the university authorities, embarked on a journey destined to last ten years. He first went to Leiden, plunging into humanistic and medical studies that were to carry him far afield. In medicine, Harvey's discovery and the gradual emancipation from Galen and the consideration of Aselli's new vessels filled Leiden with eager students whose dissections were much debated. In 1641, in co-operation with Jan de Wale, who wrote about Harvey's discovery, Thomas Bartholin published his revision of his father's anatomical institutions, the first of many revisions of a favored handbook. The year before he had gone to Paris, rather weak from hard work and from the unhealthy Dutch climate. From this time we frequently hear of his ill health. Since Jean Riolan did not attract him greatly, he proceeded southward to Montpellier where his attention was taken by the local observation of phosphorescent (infected) meat; but Harvey was not popular there, hence the young man proceeded to Padua where he established himself with several relatives and became a favorite of Vesling and Sala and found a friend in the archeologist, Johan Rode. He went to Rome, to Naples (Severino), to Sicily, and even as far as Malta, everywhere studying nature and man and finding the famous "sealed soil" an object of study. He also found and observed the much-discussed glossopetrae, a fossil later recognized in its true relations by Steno. Returning north he visited Cecilio Folli and went back to Padua, published his book on the unicorn (1645), now a mere philologic-antiquarian curiosity typical of the age, and proceeded to Basle where the University conferred the medical doctorate upon him. He was urged to return home, but continued studies enticed him back to Paris. The anatomical textbook meanwhile had been attacked by Caspar Hofmann in Altdorf, the defender of Galenic principles and rather a formidable figure in academic circles. Speculations on the lance-wound suffered by Christ on the cross, a paper on laryngeal infections in children, and the study of Hippocratic antiquities occupied Bartholin's attention during a second sojourn in Holland, but he returned to Denmark in 1646 with a halo of European fame—and never again left his native land.

Thomas Bartholin, preferring to continue his studies rather than engage in

medical practice, was given a professorate in Copenhagen in 1647. An anatomical "theater" had been established by Simon Paulli, and from 1649 Bartholin demonstrated dissections publicly, human material being scarce, supplemented by lectures. His publications bear witness henceforth to a tireless activity, papers flowed from his fertile pen, correspondence and discussions with his foreign friends were voluminous. He carried on polemics with Hofmann and Riolan. Then, in 1651, came Jean Pecquet's *Experimenta nova anatomica* with an assertion that Aselli's vessels do not carry chyle to the liver but, by way of the thoracic duct, through the left subclavical *vene* into the blood stream. This discovery roused every active anatomist to new efforts, and Bartholin, with his capable assistant Michael Lyser, carried Pecquet's researches forward; in 1652 they discovered the chylus bladder, the thoracic duct and its insertion into the left *axillaris,* and there soon followed publication of the famous *De lacteis thoracicis in homine brutisque,* with subsequent communications, e.g., *Dubia anatomica de lacteis thoracicis* (1653). Meanwhile Olof Rudbeck, working in the same field, had plowed the same ground. In 1653–54 there was a veritable avalanche of polemical writings from several sides, involving Riolan and others. Then, in 1654 a successful dissection of a greatly emaciated human body revealed the fabric of the lymphatic system except for minor details. The discussions back and forth, in all their detail, are voluminous. Historically, however, priority in discovering and recognizing the thoracic duct and the lymph vessels in animals and in man, belongs to Thomas Bartholin (with due credit to Aselli and others for their findings), while Rudbeck, according to Dr. Garboe, may have a slight lead in recognizing the lymph vessels as such.

Dr. Garboe draws a detailed and very interesting picture of Thomas Bartholin's manifold activities during these years when the great investigator's powers were in full flower. Bartholin's many minor contributions to research and observations in many fields of science are analyzed and explained as they never have been before. The *Historiarum anatomicarum et medicarum centuriae* and the later *Epistolae* and other collective writings are notable as evidence of their author's natural bent for careful observation; his philosophy was governed by an ardent desire for truth, however baffling to tradition.

Thomas Bartholin throughout his mature life suffered from a combination of ailments aggravated by incessant work and restless activity. He rose to the highest honors afforded by his school, and yet, amidst these attainments, resigned his professorship of anatomy and entered the wider field of what might be termed executive and philosophical Medicine and *humaniora.* This took place in 1656. The remaining twenty-four years of Thomas Bartholin's life are reserved for the second volume of this monograph.

Chicago, Illinois J. CHRISTIAN BAY

ISABEL A. HAMPTON, AND OTHERS. *Nursing of the Sick, 1893*. Papers and discussions from the International Congress of Charities, Corrections and Philanthropy, Chicago 1893, published in 1949 under the sponsorship of the National League of Nursing Education. New York–Toronto–London, McGraw-Hill, 1949. xix + 218 pp. $3.50.

THE year 1893 stands as an important landmark in the history of skilled nursing as a profession in this country. Up to around 1890 the general tenor of modern nursing activities in America—then about twenty years old—had been individualistic and practical. But it was at the 1893 convention that the foundation for a national organization of nurses was laid, and this meeting at the Columbian Exposition in Chicago in 1893 was the first of all the nursing conventions held since that time. It was also the beginning of formal international collaboration among nurses, which led a few years later to the foundation of the International Council of Nurses. In the same year Lillian Wald and Mary Brewster founded the Henry Street Settlement in New York which gave vigorous leadership to the public health nursing movement, and the American Society of Training Schools for Nurses was launched—the first professional organization of nurses in the United States and Canada and the parent of the present National League of Nursing Education, the American Nurses' Association and the Canadian Nurses' Association. The leading spirit in organizing this new superintendents' society was Isabel Hampton, together with a group of such able and enterprising women as Lavinia Dock, Louise Darche, Irene Sutliffe, and Edith Draper.

The budding profession made its first bow before a world audience under the gracious and friendly sponsorship of Dr. John S. Billings, the chairman of the whole conference. Isabel Hampton presented the keynote address, "Educational Standards for Nurses." Twenty-nine other papers were given; one after another amplifies the central themes of the changing situation in nursing, the joint responsibility of nurses, the value of co-operation and reciprocity, the need for greater uniformity in standards and programs. There are interesting papers on the work of Catholic and Protestant nursing orders; on missionary, military, workhouse, and district nursing; on the nursing care of special types of patients —mental, maternity, children, and others; on nursing schools and homes under different systems of training, including that of the Red Cross. There are also hints as to the revolutionary scientific and technical changes introduced in both surgical and maternity wards and operating rooms by the new antiseptic and aseptic techniques, and to the sanitary reforms which were beginning to cut down the high death rates from communicable diseases. There is even an address by the revered leader, Florence Nightingale, on "Sick Nursing and Health Nursing."

The papers produced in this volume impress one with the high caliber of

the writers and the amazingly mature and foresighted ideas expressed by many of them. The report gives us insight into one of the most fascinating chapters in the annals of the nursing profession, and it is a work of reference that should not be lacking in any professional library. It is recommended to nurses, physicians, hospital directors, and laymen alike. In consideration of the dearth of source material on nursing history, the National League of Nursing Education and the publishers are to be congratulated for having reissued this informative and stimulating collection from the transactions of the Congress published in 1894, so that they are now readily available again.

New York City Martha Alexander

Major Greenwood. *Medical Statistics from Graunt to Farr.* (The Fitzpatrick Lectures for the years 1941 and 1943, delivered at the Royal College of Physicians of London in February 1943.) Cambridge, At the University Press, 1948. 73 pp. $2.00.

The four Fitzpatrick lectures issued in this slim volume deal with the early history of medical and social statistics. Originally published in the journal *Biometrika* (1941, 1942, 1943), they now appear together and for this one may be duly grateful. In a sense, this volume is a companion piece to the author's *Some British Pioneers of Social Medicine* (Oxford Press, 1948). Here the late Dr. Greenwood discusses the lives and work of William Petty, John Graunt, Edmund Halley, Gregory King, Richard Price, Thomas Short, Deparcieux, Johann Peter Süssmilch, and finally William Farr. This is a book written *con amore* in that delightfully urbane tone that we have come to expect of Greenwood.

The reader should not expect to find here any discussion of the social problems that led a man like Graunt to occupy himself with little sums, or that made Petty in his person and his work a focus for the social trends of the time. For these topics the reader will have to look elsewhere. What the reader will find is a series of essays by a man who is deeply imbued with respect for the labors of these early workers in the garden of statistics, and who is genuinely fond of them as personalities. Thus over half of the seventy-three pages in this book are given over to the lives of William Petty and John Graunt.

As a contribution to the history of the numerical method in medical problems Dr. Greenwood's book deserves to be widely read. It is a tribute to men who were fired, in the words of Thomas Hobbes, by a "Desire to know why, and how, curiosity, which is a lust of the mind, that by a perseverance of delight in the continued and indefatigable generation of knowledge, exceedeth the short vehemence of any carnal pleasure."

George Rosen

REUBEN FRIEDMAN. *The Story of Scabies.* Volume I: The Prevalence (Civil and Military), Prevention and Treatment of Scabies, and the Biology of *Acarus Scabiei,* from the Earliest Times to the Beginning of World War II. New York, Froben Press, 1947. xxi + 468 pp., 114 illus., 36 tables. $7.50.

IN his four-volume study of scabies Dr. Friedman's broad purpose is to stress the fact that "throughout the ages and until only recent years Medicine's knowledge or lack of knowledge of the nature, cause, manifestations and treatment of the disease known as scabies has been paralleled by its knowledge or lack of knowledge, of the nature, cause, manifestations and treatment of contagious diseases in general." He demonstrates that the parallel is a close one.

In the history of scabies, as in that of so many other diseases, the facts, even though known, have been discarded frequently in favor of some preconceived theory or false hypothesis. The discovery of the itch mite (*Acarus scabiei*) and its causative relationship to the disease by Bonomo and Cestoni in 1687 was a strong link in the chain of the doctrine of the microbic origin of infectious diseases. Its ultimate acceptance dealt a death blow to the doctrine of humoralism which as a pathological concept had been dominant in medicine from the days of Hippocrates and Galen. In his article in *Medical Life* (August, 1934), entitled "The Centenary of Renucci's Rediscovery of the Acarus Scabiei," Dr. Friedman brought to light again this remarkable contribution by Renucci to the study of the disease. He has written a number of articles and monographs on the subject of scabies and is ideally qualified to write the definitive study of the development of knowledge of the disease.

Volume I deals with the prevalence of scabies in civil and military life, the prevention of the disease, the biology of the *Acarus scabiei,* and in the last chapter there is a complete study of the treatment of scabies. Here again we are confronted with the story of rigid minds who faced Bonomo's theory of eradication of the disease by external use of paraciticides with scorn, despite the fact that the scabicidal value of sulphur had been realized for centuries.

In the section on scabies in civil life the author shows how the colonization of the *Acarus* in America increased following the tides of immigration and war, with their accompanying circumstances of poverty, poor hygiene and overcrowded conditions. There is a delightful chapter on scabies in Colonial America with diary excerpts and sections from broadsides and handbills of the time to illustrate contemporary treatment.

Dr. Friedman emphasizes the significance of scabies in military history, since its prevalence interferes with military efficiency and its secondary complications produce long illnesses which impede military planning. As in the histories of other phases of medicine, we see that in the story of scabies there were several men who projected their thoughts in advance of their time. Sir John Pringle, who

stands out in the history of asepsis for his series of experiments testing the effects of delaying putrefaction and who is credited with having originated the neutral hospital or Red Cross idea, gave an advanced conception of scabies in the second edition of his *Observations on the Diseases of the Army* in 1753. He spoke of the itch as "confined to the skin . . . best accounted for by Leeuwenhoek from certain small insects he discovered in the pustules by the microscope." With a disregard of medical theorists Pringle wrote that sulphur was a specific. This was eighty-two years before the *Acarus* was rediscovered by Renucci in 1834. Again in 1786 the Hanoverian physician Johann Ernst Wichmann revived the idea that scabies was due to a parasite and contended that field hospitals were permanently infected with the disease, the mites being hatched there continuously due to the impossibility of cleaning army blankets adequately.

The section on the biology of the *Acarus* is well illustrated with drawings and photomicrographs from the first sketch by Hauptmann in 1657 to the most recent photomicrographic enlargements. The treatment of this subject is very detailed and well documented. This may also be said of the whole book, and we shall hope for a definitive bibliography in the succeeding volumes. One might wish that the volume dealing with the history of the disease had come first in order that we might see the subject in broad perspective from the very beginning rather than starting with its various problems and specialized parts, but we shall look forward to the three remaining volumes, dealing respectively with the advances made in our knowledge of scabies from the beginning of World War II until the end of 1947, the history of scabies, and translations of classical contributions to the subject. Despite the fact that the material is highly specialized, it is presented in a very lively and readable style.

Durham, N. C. MARY D. B. TRENT

W. E. TANNER. *Sir W. Arbuthnot Lane, Bart. C.B., M.S., F.R.C.S. His Life and Work*. Baltimore, Williams and Wilkins Company, 1946. 192 pp. Illus. $4.50.

SIR WILLIAM ARBUTHNOT LANE (1856–1943), regarded by many as the most skillful surgeon of his time, is probably best known among medical men for his operative technique of uniting fractured bones with metal plates. He used metal plates attached to the bones by means of screws driven through the cortex. Lane employed this method of open reduction with ever-increasing audacity and success until today this method is a commonplace in cases where it is indicated. Part of Lane's success was due to his aseptic technique which was developed to an exaggerated degree.

But Sir William was more than just an outstanding surgeon; he was above all an outstanding human being. Mr. Tanner, aware of this fact, attempts a well-

rounded portrayal of the great surgeon, but in no way achieves this aim. He quotes liberally from many interesting letters that have been forwarded to him as well as from private papers loaned by members of the Lane family, but to small avail. All he achieves is a simple addition of fact to fact, but nowhere do we find a synthesis which comes to life. Lane still awaits his Harvey Cushing or John Fulton.

Nevertheless, one can still be grateful for small favors. The information collected by Mr. Tanner is of high interest, especially his discussion of the opposition to Lane's innovations in surgery. One of the less valuable facets of Lane's work was his theory of intestinal stasis and auto-intoxication. It was in connection with this theory that he devised an operation for short-circuiting the bowel. From several of the cases described (see pp. 119–120) it would seem plausible that some of his apparent successes were produced by operating on psychoneurotic patients whose trouble was not in the intestine. Also worth noting is Lane's interest and activity toward the end of his life in the cause of popular health education.

In summary, Mr. Tanner has produced an interesting sketch of the achievement and personality of a great surgeon. Until a full-scale biography is produced, this sketch will have to suffice. There is a 31-page bibliography of the published writings of Arbuthnot Lane and an index.

GEORGE ROSEN

LI CH'IAO-P'ING. *The Chemical Arts of Old China*. Easton, Pennsylvania, Journal of Chemical Education, 1948. viii + 215 pp. 83 illus. $5.00.

The Chemical Arts of Old China was first written in Chinese and published by the Commercial Press, Ltd., Shanghai, in 1940. Its success in China can be gauged by the fact that a second edition followed only one year later and simultaneously with it, a translation into Japanese. The present volume is the author's own translation into English.

Dr. Li is eminently qualified to write on his chosen subject. By profession he is a teacher of chemistry at National Northeastern University in Mukden, China, specializing in industrial chemistry; by avocation he is a scholar and a historian. In writing for his fellow countrymen, Dr. Li succeeded in tracing objectively the validity of the various claims that most of the important scientific discoveries had been made by Chinese much earlier than by Westerners. The author finds that these claims are warranted in many cases, but he presents his evidence in a way that is meant to stimulate further ambition in scientific research, rather than lead to complacency about ancestral achievements. To the American reader he offers much that is new and rectifies traditional misconceptions.

In addition to the introduction the book consists of fourteen separate chapters or essays, describing the history of the various branches of chemistry including alchemy. Dr. Li's research is based on Chinese writings exclusively and, wherever they are pertinent, the original passages are given in translation. Many of the topics, such as "metals," "ceramic industries," "colors and dyes," etc., are not only of interest to chemists or historians of science or art, but of practical importance to collectors and dealers of Chinese art objects. The volume is handsomely bound and contains eighty-three excellent illustrations.

The reviewer regrets that this book—the first on the subject to appear in English—does not provide relevant footnotes, references, and an index for the use of Western scholars in the field. However, it would be unfair to stress these omissions too much, since the writer of the preface, the late Dr. Tenney L. Davis, himself a prominent chemist and historian of chemistry, who was responsible for this American edition, enumerates and explains these shortcomings.

Chicago, Illinois Ilza Veith

Henry J. C. Gibson. *Dundee Royal Infirmary 1798 to 1948. The Story of the Old Infirmary with a short account of more recent years.* [Dundee], Printed by William Kidd and Sons, Ltd., 1948. 71 pp. Illus. 15/–.

At a time when the national government in Britain has assumed responsibility for the affairs of all hospitals throughout the land, it is of interest to look back upon the history of the voluntary hospital. An attractive contribution to this history is Dr. Gibson's small book on the Dundee Royal Infirmary. Inevitably the story treats of local worthies and items of interest to those connected with the institution. And yet, seen in a broader perspective, it links up with the general social and medical background of the past one hundred and fifty years.

The first patient was admitted to the Infirmary on March 11, 1798, but it had its antecedents in the Voluntary Dispensary first organized in Dundee in 1735. Of considerable interest are the details on hospital management. Light is thrown upon current attitudes when we are told that after 1800 a ward was set apart for the admission of venereal patients, the rate being five shillings a week "under this limitation that prostitutes are upon no account to be admitted, nor any person in any venereal state, unless such person is positively recommended as a proper object by two of the Committee, not professional men." At first, also, the day-to-day affairs were in the hands of the Resident Apothecary, who combined the duties of a dispenser, steward, and a sort of house surgeon. During the nineteenth century infectious disease was a problem of considerable magnitude, and it was not until the end of the century that the problem of the control of infectious disease was finally resolved.

In essence, this story of the Dundee Royal Infirmary is an account of a stewardship freely undertaken by a group of private persons over two hundred years ago, and which has been discharged to the present. The volume is fully illustrated with pictures of the past and present staff, documents relating to the hospital, and photographs of the present institution. Included also is the Royal Charter granted to the hospital in 1819 by George III.

GEORGE ROSEN

NOTES ON CONTRIBUTORS

Fenwick Beekman, M.D., is Chief of Surgical Service, Hospital for Special Surgery, New York, and President of the New-York Historical Society.

Marion Brown, B.A., B.L.S., is in charge of Special Collections in the John Hay Library of Brown University and is a candidate for a graduate degree in the American Civilization Program.

Wilburt C. Davison, M.D., is Professor of Pediatrics and Dean of the School of Medicine, Duke University, Durham, N.C.

Arvel B. Erickson, Ph.D., is Professor of History at Western Reserve University, Cleveland, Ohio, and the author of several articles on nineteenth century England.

Margaret Tallmadge May of the Department of Zoology, Cornell University, Ithaca, New York, operates a poultry farm with her husband near Ithaca. The Steno translation is her first publication, and she is now working on an English translation of the *De usu partium* of Galen.

Charles Singer, M.D., Professor Emeritus of the History of Medicine at the University of London, is well known to everyone interested in the history of science and medicine.

Printed in the United States of America
by The Hildreth Press, Inc.
Bristol, Connecticut

William Henry Welch
1850–1934

GEORGE ROSEN

THE career of William H. Welch epitomizes the revolution which took place in American medicine during his lifetime and in which he played such an important part. Welch belonged to that generation of American students who in the latter half of the nineteenth century flocked to Germany to learn pathology from Virchow, physiology from Ludwig, and bacteriology from Koch. These men applied the spirit and the methods that they acquired to their work in America. In so doing, they effected a change in the teaching, practice, and advancement of medicine in this country which can only be called revolutionary.

Welch was born on April 8, 1850 in Norfolk, Connecticut, the son of a physician. After graduation from Yale and a period at the Sheffield Scientific School of Yale University he matriculated in 1872 at the College of Physicians and Surgeons of Columbia University. Medical education in the United States was then generally inadequate. For the most part the medical course consisted of didactic lectures. Practical work was restricted to anatomy, medical chemistry, and clinical instruction at the dispensary and the hospital. Three years' attendance at lectures was required for graduation. Attention was centered on making a practitioner of the student.

A student with some ambition and initiative could find something to do outside the required course, and Welch became prosector to the professor of anatomy. He also devoted a good deal of his time to autopsy work. In 1876, after a year's internship, Welch sailed for Europe, making Strassburg his initial destination. From Strassburg, he passed on to Leipzig, Breslau, and Vienna where he studied with some of the outstanding medical teachers and scientists of the day. Carl Ludwig, Julius Cohnheim, and Friedrich von Recklinghausen exerted the most significant influence on Welch during his medical "grand tour." During his stay at Breslau, he had an opportunity to witness Koch demonstrate some of his researches before Cohnheim and Ferdinand Cohn. In the spring of 1878, his educational pilgrimage over, Welch returned to New York.

Soon after his return from Europe, Welch opened the first pathology laboratory in an American medical school at Bellevue Medical College, where he worked for six years. His great opportunity came, however, when

he was invited to guide the new Johns Hopkins Medical School, to become professor of pathology as well as pathologist to the hospital.

At this time, such departments of pathology as existed in the United States had already broadened out to include, besides pathological anatomy, morbid histology and sometimes experimental pathology and bacteriology. When Welch came to set up his pathology department at Johns Hopkins, he included all these fields, bringing into play the knowledge and resources he had gathered on his educational pilgrimage. In this way he helped to establish a broader scientific foundation for the future development of medicine.

At Johns Hopkins, Welch was asked to select the staff for the Hospital and also the faculty of the Medical School. It was due to his influence that Osler, Halsted, and Kelly were chosen in 1888 and 1889 for the Hospital and later when the Medical School opened in 1893 that Mall, Howell, and Abel were picked to form part of the faculty of the Medical School.

Welch began to work and teach before the medical school was completed. Research was carried on. Welch discovered the gas bacillus, and with Flexner made important studies of diphtheria. As a result of his interest in animal pathology, he did work of lasting value on hog cholera. His papers on thrombosis and embolism and on the structure of emboli all contain important factual contributions to medical knowledge.

For Welch, however, medicine was not something confined solely to the clinic and the laboratory. He was fully aware that disease was not only a biological phenomenon, but also a social fact. In 1915, speaking to the National Conference of Charities he pointed out: "It is a well-known fact that there are no social, no industrial, no economic problems which are not related to problems of health. The better conditions of living, housing, working conditions in factories, pure food, a better supply of drinking water, all these questions, social, industrial, and economic, are bound up with the problems of public health."

In 1917 Welch resigned from the chair of pathology to devote himself to problems of public health. As a result, a new school of hygiene and public health was established at Johns Hopkins, involving a broader idea of public health control and a new conception of its organization. Nine years later, in 1926, Welch resigned from the School of Hygiene to further the study of medical history.

This aim was in line with his broad concept of medicine, and its concrete expression was Welch's last great accomplishment, the establishment of the first institute of medical history in the United States. His interest in

the history of medicine was of long standing, extending back to his student days; and this despite the fact that when he attended Haeser's lectures at Breslau, he found them "deadly dull." In 1888, for example, in a talk at Yale, he advocated the study of medical history and deplored its neglect on the ground that there is nothing "more liberalizing and conducive to medical culture than to follow the evolution of medical knowledge." Throughout his career at Hopkins, Welch continued to manifest a keen interest in history. On October 17–18, 1929, the department of the history of medicine and the library were officially dedicated, with Harvey Cushing, Karl Sudhoff, and Abraham Flexner as the principal speakers.

William Henry Welch was one of the most potent forces for the advancement of medicine that this country has ever had. He was the central figure of a group of men who transformed American medicine from an art practised by rule of thumb to a science. Welch's contribution was not in great discovery, but rather in breadth of view, in the ability to realize the implications and means for implementation of ideas, and in organizational drive and ability. Welch and his colleagues accomplished much because theirs was in a sense a unique opportunity. An expanding industrial economy made available resources which enabled these men to turn their ideas and abilities to good account. Welch and his contemporaries would certainly have been much less successful in their creative efforts had they been unable "to collect large tribute from the favored disciples of Plutus." Yet it must also be remembered that without the inspiration and the creative ideas of a Welch, the provision of money and facilities would not have accomplished what was achieved.

In this sketch, it is not possible to discuss the multifarious activities in which Welch was involved. Nevertheless in this centenary year of his birth it is well to recall that the life of William Welch spanned a crucial period in the development of American medicine. On April 8, 1930 Welch celebrated his eightieth birthday. The tribute paid to him and his work was an honor to a generation and their contribution to American medicine. His death in 1934 marked the end of a period and the beginning of another for which he had laid the foundation.

Thomas Harris, M.D., Naval Surgeon and Founder of the First School of Naval Medicine in the New World

LOUIS H. RODDIS*

THOMAS HARRIS, a naval surgeon of the first half of the nineteenth century, is a relatively unknown name in the history of American medicine, yet he had a most distinguished career. He was a surgeon of national reputation who operated upon President Jackson; he became administrative head of the Medical Department of the Navy, the office corresponding to the present title of Surgeon General; and he established the first school of naval medicine in the United States and, indeed, in the Americas. He maintained this school practically by his own efforts for over twenty years, and while it was eventually closed for lack of funds, it was the forerunner of the present Naval Medical School at the National Naval Medical Center, Bethesda, Maryland.

Thomas Harris was born in East Whiteland, Chester County, Pennsylvania, on January 3, 1784. He came of fine old colonial stock and his immediate ancestors were by no means undistinguished. His father, Brigadier General William Harris of the Pennsylvania Militia, served in the Revolutionary War and the Whiskey Rebellion and died at the beginning of the War of 1812. He was a farmer of East Whiteland, had served in the State Legislature, and was an Elder of the Presbyterian Church. Harris' mother was Mary Campbell, daughter of the Reverend John Campbell, a Presbyterian clergyman. The early education of Thomas Harris was at the Brandywine Academy, Brandywine Manor, Chester County, Pennsylvania. He entered the University of Pennsylvania as a medical student in 1806 and received his degree of Doctor of Medicine on April 19, 1809. He appears to have engaged in medical practice in Philadelphia, but at the beginning of the War of 1812 he was appointed a surgeon in the Navy. His commission was transmitted to him in the following letter:

Navy Dept.
6 July 1812.

Doct. Thos Harris
Philadelphia

Your nomination by the President to the Senate of the U.S. as a Surgeon in the

* San Diego, California.

Thomas Harris 1784–1861
The second Chief of the Bureau of Medicine and Surgery

Navy of the U.S. having been confirmed, I have the pleasure to hand you herewith your commission as Surgeon in the Navy. . . .

His first orders were as follows:

Navy Dep.
22 Sep 1812.

Doct Tho Harris
of U. S Navy Philada

You will report yourself to the commanding officer of U.S. Ship *Wasp,* as Surgeon of that ship.

(Signed) P. Hamilton

The *Wasp* was an 18-gun sloop of war carrying 137 men and commanded by Captain (Master-Commandant) Jacob Jones. Dr. Harris did not have long to wait to see plenty of action, for the *Wasp* cleared the Delaware Capes on October 13 in a storm. Five days later it encountered and engaged the British brig of war, *Frolic,* 18 guns and 110 men, Captain Thomas Whinyates commanding. The *Frolic* was accompanying a convoy of merchant ships from Honduras to England. The *Wasp* was to windward when the *Frolic* was sighted and could have avoided combat had the *Frolic* seemed too strong for her. As they made her out to be a vessel of about their own class, they bore down upon her. The weather had moderated somewhat, though a heavy sea was still running. The English ship accepted the action to protect her convoy. The two vessels fought almost yardarm to yardarm in an exceedingly fierce action. The *Wasp* lost her main and mizzen top masts and spanker gaff, while the *Frolic* had her boom mainsail shot away which rendered her practically unmanageable. The *Wasp* fell across her bow and boarded her. So severe had been the American fire that the decks of the British ship were covered with killed and wounded, and there was very little resistance to the boarding party. The whole action took only forty-three minutes. Of the British crew, thirty were killed and only twenty remained unwounded. The American loss stood at five killed and five wounded.

Dr. Harris had plenty of surgical experience, for in addition to caring for his own wounded, he at once assisted the British surgeon in caring for the large number of British wounded. Shortly after the battle, the British line-of-battleship *Poictiers* captured the *Wasp,* recaptured the *Frolic* and took both vessels into St. Georges, Bermuda. From here the American prisoners, including Harris, were returned in a cartel ship, the American brig *Diamond,* which left St. Georges apparently about November 5, 1812.

Thus Harris in less than a month after entering the naval service found himself a veteran of one of the most famous and desperate single ship com-

bats in our naval history. His captain spoke in the highest terms of his professional skill, his devotion to his patients, and his work in caring for the wounded. The British captain also expressed his appreciation for his assistance to the surgeon of the *Frolic* and the English wounded, among whom was the British surgeon himself. The medal which officers and men of the *Wasp* received was not struck, however, until a number of years afterward. The document transmitting this medal to Dr. Harris is as follows:

> In compliance with a Resolution of the Congress of the United States, the President directs me to present to you a Medal in testimony of the high sense entertained by Congress of your gallantry, good conduct and services in the conflict with the British Sloop of War *Frolic*.
>
> (Signed) Smith Thompson
> Feb. 10, 1820

After his return to the United States, following the *Wasp* and *Frolic* action, Harris appears to have been ordered to duty with the naval forces on Lake Ontario and vicinity. His name appears on the rolls of the U.S.S. *Mohawk* January 1, 1813, and he was carried on this ship until December 31, 1814. At that time his former captain on the *Wasp,* Jacob Jones, was in command.

Eight days after the treaty of peace was ratified which ended the war between the United States and Great Britain, President Madison recommended war with Algiers, and Congress declared war on that country March 3, 1815. The Barbary States had continued to prey upon the commerce of the United States and European powers, and it was now decided that since the war with Great Britain was over, the naval forces which had been accumulated during that conflict should be used against the Barbary powers to compel them once and for all to abandon their attacks on American commerce. It was also intended to stop all tributes to them and to demand the release of any American citizens held as prisoners. Two squadrons were assembled. One, under Commodore Stephen Decatur which sailed May 20, 1815, consisted of three frigates, the *Guerrière, Constellation,* and *Macedonian,* two sloops of war, three brigs, and two schooners. Harris on March 25, 1815 had been ordered to the *Macedonian.* This squadron on July 17 intercepted the flagship of the Algerian fleet near Cape de Gat and in a short action captured her with loss of twenty killed on the Algerian vessel, including the commander. The Algerians also had many wounded, and Harris was one of those ordered to the captured vessel, the *Mashuda,* 46 guns and 446 men, to care for the wounded. The American squadron had four killed and ten wounded, most of them by a gun explosion on the *Guerrière.*

This war was a short one and led to almost complete compliance with the American demands; a considerable part of the United States naval forces returned to the United States that fall. On November 27, 1815, Dr. Harris was granted a three months' furlough. Upon the termination of this leave he was ordered to report to the Navy Department in Philadelphia, which he did in the following letter:[1]

Philadelphia, March 1, 1816.

Sir,

The leave of absence which you had the goodness to grant me for the purpose of attending the medical lectures has this day expired. If you are of opinion that officers cannot serve their Government more faithfully, or to more advantage, in time of peace, than by cultivating a perfect knowledge of their profession, I should consider myself particularly favoured by being ordered to duty on this station, that I might attend during the summer, the lectures on botany & mineralogy. I graduated, it is true, in this university, previous to my entering the Navy, but as valuable improvements are yearly making in our extensive science, my duty as well as ambition prompts me to endeavour to keep pace with them. Indulgences of this kind have been frequently granted to other surgeons who have not seen as much service as myself. Doctors McReynolds, Washington, Horsley, and New were privileged by the Department, to attend lectures and retained on full pay, even in time of war, and Doctors Marshall and Hunt have been doing duty on the same station these five or six years.

I have the honor to be
very respectfully
Thos Harris
Surgeon.

The Hon. B. W. Crowninshield
Secty of the Navy.

At the close of the War of 1812 there were forty-seven surgeons and sixty-six surgeon's mates. As was usual after our wars, there was a reduction in the military establishment so that by five years later the number had been reduced to forty-five surgeons and thirty-four surgeon's mates. It will be noticed that the principal reduction was in the junior ranks. As is always the case, there was some difficulty in obtaining employment, particularly at some special station, and Harris was anxious to be ordered to Philadelphia. His request for duty there was not granted, and he applied for duty on board the *Guerrière*. His request is quoted here as it mentions his service with Captain Jones and names Commodore Decatur for reference as to his professional ability and character:[2]

Philadelphia, Nov. 11, 1816.

Sir,

If there be no surgeon attached to the U. S. frigate Guerrière you will do me a particular service by ordering me to join that vessel. As I have sailed with Captain Jones from the commencement to the termination of the two late wars; and as I was

[1] Letter No. 105, Officers Letters, Vol. 1, Jan.–Mar., 1816.

[2] Letter No. 75, Officers Letters, Vol. 4, 1816.

placed on furlough contrary to my wishes immediately upon my landing at Newport I hope it may not be considered too great an indulgence to be again placed under his command even though the ship be now in ordinary.

For my qualifications and character I beg leave to refer you to Commodore Decatur, to whom I have the honor of being personally known.

Very respectfully
Thos Harris
Surgeon

The Honble B. W. Crowninshield
Secretary of the Navy.

It was not until November, 1817, that he was finally ordered to Philadelphia as surgeon attached to the Marine Corps at the Philadelphia Navy Yard. It was while on duty at Philadelphia that Dr. Harris proposed to the Navy Department the establishment there of a school where newly appointed surgeon's mates could be given a short postgraduate course of instruction in the different branches of their profession, and also in the customs and regulations of the Navy. His letter, which was addressed from Philadelphia on May 10, 1823 is of the greatest interest, for it is a most admirable presentation of the need for such a school and a plan for it. It constitutes, in a sense, a charter of the first naval medical school in this country and is, so to speak, the forerunner of the present Naval Medical School at the National Naval Medical Center, Bethesda, Maryland. It is therefore quoted in its entirety, as is the letter of approval from the Secretary of the Navy, which was dated from Washington only nine days later:

Philadelphia, May 10, 1823.

Sir,

Many of the Surgeon's Mates, as well as younger Surgeons of the Navy, manifest, at present, a very laudable anxiety to acquire an intimate knowledge of their profession. As their slender pay deprives them, however, of the necessary means of instruction, the fostering assistance of government is respectfully solicited.

From the willingness which you have always discovered to improve the different branches of the service over which you so ably & judiciously preside, they feel a hope that you will accord such advantages as are essential to qualify them as useful and skillful surgeons. For this purpose they are desirous that you would afford such of them as are not on public duty, an opportunity of hearing lectures on nautical medicine, and military surgery, as well as of pursuing a course of dissections under the superintendence of some one, whom you may deem competent to this duty. In a letter to me, which I herewith enclose, the medical officers have expressed a wish, provided the scheme met your approbation, that I would take charge of this establishment, and give lectures on the branches already mentioned.

In order that you may form a judgment of the advantages which such an institution would present, I beg leave to submit a plan of instruction, which under such circumstances I should deem it advisable to pursue.

1. I would superintend the studies of the medical officers, and furnish them from my private library, with medical books, and journals.

2. I would constantly superintend their dissections, and particularly direct their attention to surgical anatomy.

3. I would deliver lectures on *Nautical medicine* in which I would instruct them in medical economy of the ship—in the most approved methods of purifying vessels, and of keeping them healthy in tropical climates in the peculiar predisposition of mariners to particular disorders—in the diseases to which seamen are liable in tropical climates, to which should be added, the experience of the Naval surgeons of Europe, as well as of this country, on the best means of preserving their health, in all latitudes.

In connection with this, I would deliver a course of lectures on military surgery, in which I would not only show them the manner of performing operations on the dead subject, but to aid their manual dexterity, I would afford them opportunities to perform similar operations themselves.

Institutions of this character are connected with all the military establishments of Europe, and from which have resulted the greatest benefits to military surgery. No one can so properly appreciate its importance as the surgeon who feels the great responsibility of his charge, and the value of the lives committed to his charge. He well knows that if he has not had proper opportunities to instruct himself in operative surgery, and especially in surgical anatomy on his familiarity with which his success in operations depends, he is not qualified to perform the duties of the important office with which he is invested. Besides a knowledge of the elements of surgery, which is acquired at our medical universities, it is necessary in order to acquire proficiency & skill, to diligently prosecute anatomical researches, and to repeatedly perform operations on the dead subject.

At present our Navy Surgeons are not presented with the means of continuing their pursuits in this manner, after entering the public service; and it is not an infrequent occurrence that the first time they pass through the details of an operation is on a patient, when it must be necessarily attended with embarrassment and awkwardness. The evils which must result on many occasions from circumstances of this kind, and the advantages to the service of measures that would enable our junior medical officers to perfect themselves in their profession, must be so apparent, that I feel persuaded of your friendly disposition to the measure proposed.

For my qualifications as a teacher, I must beg leave to refer you to the enclosed certificates from the learned and distinguished professors of the University of Pennsylvania.

The location of an institution of this character in Philadelphia would be attended with many and great advantages. Among the most important of which, is the facility with which dead subjects may be obtained for operations and dissections. Whilst, too, our medical officers were thus enjoying benefits so essential to render them useful, they would also possess the privilege of revising their general knowledge of the sciences by attending the lectures which are delivered in our most celebrated University.

Very Respectfully
Your Obdt. Servt.
Thos. Harris

The Honble Smith Thompson,
Secy of the Navy.

Navy Department
May 19, 1823.

Doct Thomas Harris
Surgeon, U. S. Navy
Present.
Sir,

I have given to your communication dated the 10th inst. that consideration which the importance of the subject justly merits. The plan you propose for the improvement of the Surgeon's Mates and younger Surgeons of the Navy in the different branches of their profession, offers fairly to be productive of much utility to the public service & receives my entire approbation and I consent to apply for the present year the sum of four hundred dollars in aid of the undertaking.

I am respectfully &c
(Signed) S. T.
(Smith Thompson
Secretary of the Navy)

From the inception of this school and for a period of twenty years young surgeons and surgeon's mates were sent regularly to it. During this time an extensive correspondence was maintained between Dr. Harris and the Navy Department, principally in regard to the progress of young naval surgeons in the school, reports on their graduation, and recommendations of various individuals for special duties because of their particular abilities. Nearly all the medical men enrolled in the navy during the period 1823 and 1843 received instruction in this school, and the effect upon the professional standards and the treatment of the sick and wounded of the navy was of a most far-reaching character. Among those who graduated from the school were G. B. R. Horner and W. S. W. Ruschenberger. The former was the author of the book on naval medicine, *The Diseases of Seamen,* long a standard work. Dr. Ruschenberger was eminent both as a naval surgeon and a scientist. As an example of the correspondence, a letter of February 23, 1829, recommends Dr. Titian Peale to the position of naturalist to a scientific expedition. Another one dated September 15, 1831 gives the period of attendance of a number of students. In another Harris pointed out to the Secretary the great advantage that young surgeons received from the opportunity of attending the school since they were able to receive free postgraduate courses in professional subjects that would ordinarily cost about $100 a course. He also pointed out that as the Surgeon's Mates, or, as they were called after 1828, Assistant Surgeons, received only $45.00 a month when on shore, they would scarcely be able to have such postgraduate instruction if it was necessary for them to pay for it. In one letter to Harris the Secretary of the Navy mentioned sending a small bottle of poppy seeds to him in order "that you may have an opportunity of making an experi-

ment upon its cultivation for the production of opium." This is an interesting reference, probably the first one in print, to a government attempt to encourage the production of opium for medicinal purposes in this country.

The following excerpts from letters of Harris addressed to the Secretary of the Navy from Philadelphia, dated March 19, 1829 and March 31, 1829, cast some light upon instruction in military and naval medicine, both in this country and abroad, and some of the medical men and institutions in Philadelphia in the early half of the nineteenth century:[3]

In the year 1823, a period when efforts were making to improve the condition of the surgical department of the navy, a letter was addressed to me by a number of the junior medical officers wishing me to give for their benefit, an annual course of lectures on military and operative surgery. These are branches of our profession of vast importance to military surgeons, and for the most part neglected in our medical colleges. Such establishments are connected with the naval and military services of France, Russia and England, and have contributed mainly to the present exalted condition of surgical science in those countries.

The letter to which I refer was submitted by me to the Honble. Smith Thompson, then Sec. of the Navy, who at once perceived the importance of the suggestions there made, and accordingly ordered me to give an annual course of instruction embracing these subjects. To carry these orders into effect he made a small annual allowance to meet the expenses of renting lecture and dissecting rooms, wages for attendants, subjects for dissection, materials for anatomical preparations, fuel, candles, etc. etc.

More than a year ago I was solicited to accept the chair of operative surgery in the *"Medical Institute"* of this city. I consented to contribute my services in the way solicited, provided the medical officers should be permitted to attend *all the lectures gratis*. This arrangement was assented to by the professors, and received the approbation of your predecessor. So that now the medical officers of the navy have the privilege of attending the fullest, and most perfect course of medical instruction delivered in the United States, and without any additional expense.

The names of the lecturers in this institution are:

Dr. Chapman on the theory and practice of physic
Dr. Horner on anatomy
Dr. Mitchell on chemistry
Dr. Jackson on Materia Medica
Dr. Bell on physiology and pathology
Dr. Deevers on obstetrics
Dr. Hodge on the principles of surgery
Dr. Harris on operative and military surgery.

My associates in this institution are among the most distinguished physicians of this city. These lectures commence on the first of April, and terminate on the last of October. The following assistant surgeons availed themselves of this course of instruction during last season:

Dr. Belt
Dr. Boyce
Dr. Moore
Dr. Rapalje
Dr. Macomber
Dr. Beers
Dr. Chandler
Dr. Tinslar

[3] Letter No. 43, Officers Letters, 1829, Vol. II.

I have regularly made annual reports detailing my course of proceeding, all of which may be found on the files of the navy department. Should you concur in opinion with your predecessors, that this establishment is worthy of being fostered, I should be gratified by your granting the requests of Drs. Moore and Horner, as well as any other assistant surgeons who can be spared from duty. Taking into consideration the rigid examinations which these gentlemen are obliged by law to undergo before promotion, it seems almost indispensable that they should avail themselves of the advantages which this institution offers.

Very Respectfully
Thos. Harris Surgeon
U. S. Naval Asylum.

The Hon. John Branch
Secy of the Navy.

The letter of March 31, 1829 requests permission to accept appointment as one of the surgeons of the Pennsylvania Hospital and indicates the high opinion his professional colleagues in Philadelphia had of Dr. Harris:[4]

Philadelphia March 31, 1829

Sir

I was elected yesterday one of the surgeons of the Pennsylvania hospital in place of Dr. Parrish resigned. The time required of me to perform this duty, is one hour twice a week, for four months in the year. As there is no emolument whatever attached to this appointment, and as it cannot, nor shall not, interfere with my public duties, I hope you will not object to my accepting it.

This interesting charity affords the best field for the exercise of surgical talents in the U States, and perhaps in the world. There is seldom a prescribing day in which there is not some operation of greater or less magnitude. This circumstance added to the opportunity of consulting in all important cases with the most eminent surgeons of our city who are associated with me, will be most improving, by enlarging the sphere of my experience, and thus rendering me better qualified to discharge my duties at the naval asylum.

There is another important consideration which urges me to accept this appointment. The junior medical officers who come to this city to attend my lectures, in order to prepare themselves for their second examination will have an opportunity of attending not only the surgical but medical practice of this institution without expense. My system of instruction will be thus rendered more perfect. Until the naval asylum is in full operation, this arrangement will be of vast utility to them, and indirectly on the service.

I have the honor to be
Very Respectfully
Thos. Harris.

The Hon. John Branch
Secretary of the Navy.

A notation on the back of the above letter grants the request so long as it does not interfere with his public duties.

He was in the habit of making an annual report on the school. In that

[4] From Officers Letters, 1829, Volume II, No. 94.

made July 1, 1839, he names fifteen surgeons and assistant surgeons who had been in attendance during the last year. He also listed nineteen officers on whom he had performed successful operations, for he was the principal Navy operating surgeon at Philadelphia. Among the names of assistant surgeons were those of Ninian Pinckney, afterwards a fleet surgeon during the Civil War, and J. M. Foltz, subsequently Surgeon General of the Navy; and among officers operated on were Captain Shrubick and Commander Charles L. McCawley. During this twenty-year period, Dr. Harris had risen to eminence as a surgeon as well as a teacher and had come to be known as one of the leading medical men in Philadelphia. His reputation as a surgeon is shown by the fact that when President Jackson desired to have a bullet extracted that he had received in a duel with Charles Dickenson in 1806, it was Harris, together with Dr. Triplett, who operated on the President. This was in 1832, twenty-six years after the wound had been received.

In these days when budgets run into millions or billions, it is of interest to note that Harris maintained this school of instruction in naval medicine for a period of twenty years on a budget of approximately $400 a year. He kept a very accurate account of expenditures. In 1841 the cost was $370 and in 1842 the annual cost was $343. The whole school came abruptly to an end in 1843, apparently because the Secretary of the Navy, who at that time was A. P. Upshur, found that there was no proper authorization for allocation of funds for this purpose. He announced this fact to Harris in a letter dated January 20, 1843, which is here quoted:[5]

Navy Department
January 20, 1843.

Surgeon Thomas Harris
Phila.

Sir,

It has come to my knowledge this morning, for the first time, that an allowance has been made, from year to year, for many years past, for the rent of a Lecture room, for subjects for dissection, &c &c, under your supervision and authority. I am fully aware that this could not and would not have been done, without some sanction from the Navy Department, although the Auditor has not yet been able to discover at what time or in what manner, the practice commenced. It is not my purpose therefore, to express any censure upon those who have heretofore been engaged in it.

But as I cannot find any shadow of authority in the Department to make any such application of the public money, I merely announce to you my intention not to sanction any such expenditure for the future.

(Signed) A. P. Upshur

[5] Letter No. 120.

Dr. Harris apparently replied at once in a long letter in which he gave all details of the origin of the funds and the history of the school from its foundation. He mentions incidentally that it started as a private dissecting course in 1822, at which time he invited some junior medical officers who liked the instruction and urged him to give a series of lectures. He suggested that they request it in writing, and it was these requests which formed the basis for the first authorization. On January 31, 1843, the Secretary immediately replied to Harris in terms that were very pleasing as regards his opinion of his integrity, but not so pleasing in that he pointed out that he felt there was no allowance under the law to continue payments for the school and that they would therefore be discontinued. Because it expresses the whole matter so well, this letter is also quoted:[6]

Navy Department
January 31, 1843.

Surgeon Thomas Harris,
U. S. Navy, Phila.

Sir, Your letter of the 26th inst has been received. I am satisfied, from your statement, that I owe it to my own want of memory alone, that I have expressed any *surprise* at the expenditure in question. It is not possible for me to doubt, & I certainly do not doubt, that any fund entrusted to you will be faithfully administered. Neither do I doubt the utility of the lectures you have been in the habit of giving, & sincerely regret that they cannot be continued. I do not see however, that I have any right or power to authorize such an expenditure of the public money. When the subject was before me in 1841, I did not enquire into this matter, but took it for granted, I presume, that the authority was properly given. I am however, very clearly of opinion that the Secretary of the Navy has no such discretion. While, therefore, you have faithfully performed your trust, I feel obliged to discontinue the allowance as unauthorized by law.

I am, respectfully yours
(Signed) A. P. Upshur

A year later, on April 1, 1844, Harris was appointed Chief of the Bureau of Medicine and Surgery to succeed Dr. W. P. C. Barton. He was appointed by President Tyler and as he served as Chief of the Bureau until 1853, he held office under five presidents—Tyler, Polk, Taylor, Fillmore, and Pierce. With Dr. Barton, whom he succeeded as Chief of the Bureau, Harris had long been at enmity. The origin of their difficulties seems to have been in some measure the desire of both to remain on duty in Philadelphia in charge of the hospital there. In the latter part of 1817 Harris had been detached from the Medical Department at Philadelphia and replaced by Barton. He made allegations that this had been done as the result of false representations to the Navy Department, and a court-martial and court of

[6] Letters to Officers, Ships of War, No. 34, page 158.

inquiry found that this appeared to be the case and directed by an order of the 4th of March 1819 that Harris be restored to his former situation. At that time Harris, in an extremely bitter letter addressed to the Secretary of the Navy, pointed this out, as well as the fact that Barton had remained ashore throughout the War of 1812, while he had spent practically the entire period of the war at sea and had also served in the Algerian War in Decatur's Squadron in 1815 or, as he expressed it: "During the war I attended to the duties assigned to me by my government, without the intermission of a day . . . ," and by contrast he states that Barton ". . . absented himself from duty and declined the orders of his government to join our vessels when on the eve of sailing and were in want of a surgeon."

Dr. Harris was one of the three medical officers selected to report their opinions as to the use of distilled spirits by midshipmen, Dr. Barton being one of the other medical officers whose opinion had been sought upon the subject. On this occasion Harris agreed with Barton, however, both of them strongly condemning the practice of issuing distilled spirits to midshipmen. The following few paragraphs are quoted from his report showing the forthright way in which he expressed his opinions, as well as the plain common sense reflected in them:

> It is not by injuring the morals and health of midshipmen alone as such, that the daily ration of ardent spirits appears to be objectionable. They rise to the highest rank by gradual promotion, and therefore are educated for important and responsible commands, by passing through all the gradations of the public service. An intemperate midshipman, will not become a temperate lieutenant, or captain. It would be therefore painful to reflect on the possible results of important enterprises conducted by individuals whose judgment had been impaired and energies enfeebled by unrestrained indulgence.
>
> Example is a powerful engine in all human actions, and its influence here on the character and discipline of the Navy ought not to be overlooked. The subordinate looks up to his superior as a director and pattern, and the color of his own conduct will partake largely of that which constantly passes before him. If the superior should be intemperate, which happily is a most rare occurrence in our navy, those under his command, disposed to intoxication, will cease to consider the act either criminal or unofficerlike. The hurtful operation of such an example extends to the lowest ranks of the service, and opposes an unsurmountable obstacle to every effort at reform.
>
> Though our officers in general are as temperate as an equal number of citizens in any other situation in life, yet it is in vain to conceal, that there are too many, among the junior officers particularly, who drink more than is consistant either with health or sound morals. It should be therefore a matter of congratulation, that the energies of government are about to bear on this point. If there is any thing now which can arrest the navy in its career of usefulness and glory, it is the deadly atmosphere which is diffused around it by this desolating poison.

Of interest is his observation, which is undoubtedly perfectly true, that

". . . our officers in general are as temperate as an equal number of citizens in any other situation in life."

Another interesting fact is that Harris concurred in the belief that spontaneous combustion of the human body can take place in the alcoholic. Indeed, it was only in the latter half of the nineteenth century that it was accepted that prolonged and excessive use of alcohol could not produce spontaneous combustion of the body.

His administration as the second Chief of the Bureau of Medicine and Surgery was of considerable importance to the Medical Department of the Navy. As has been mentioned, he was appointed Chief of the Bureau April 1, 1844 and served until September 30, 1853. Thus, for nine years the newly organized Bureau had at its head this able and energetic medical officer, and his work did much to place the new central medical administrative unit on a firm foundation.

In 1846 the Mexican War began, concluded by the treaty of Guadalupe-Hidalgo in 1848. This was the first war after the organization of the Bureau of Medicine and Surgery and the first war, therefore, in which that Bureau exercised an influence over the health of the Navy and the care of the sick and injured during the war period.

It was natural that one who had been so greatly interested in the character and professional qualifications of young medical men applying for entrance in the Navy should do much to keep the standard for entrance in the Corps at a high level. He also began to introduce uniformity in the types of drugs and dressings used in the Navy, and to the methods of procuring them. It would not be too much to call him the father of medical procurement in the Navy as this fundamental function of the Bureau was first organized under him.

Upon the completion of his duty as Chief of the Bureau, Harris spent the next four years as President of the Examining and Retiring Board in Philadelphia. He himself retired in 1857 and continued his residence in that city. Dr. Edward Shippen, in a letter dated October 27, 1909, a copy of which is in the Bureau of Medicine and Surgery, Navy Department, says: "He lived in a very lovely old house (9th and Spruce) with a terrace and a garden (Philadelphia) now all swept away. You know that for very many years after his service in the War of 1812–1815 he lived in Philadelphia and had a very large practice. The City of Philadelphia voted him a silver service for his work in the cholera year of 1832."

He was made a member of the American Philosophical Society in

1828. He was also the author of the *Life of Commodore Bainbridge, United States Navy.*

He was twice married, first in January, 1820 to Miss Jane Phillips Hodgdon, the daughter of Major Samuel Hodgdon who had been an officer of the United States Army and was Quartermaster General and Paymaster in General St. Clair's army in the expedition against the Indians in 1791. Of this marriage, he had five children, three sons and two daughters. Two of the sons became physicians; one of them for a time was a surgeon in the Navy. After the death of his first wife, he married on April 30, 1839 Miss Ester White MacPherson, also the daughter of a Revolutionary soldier. Her maternal grandfather was William White, the first Protestant Episcopal Bishop of Pennsylvania. There were no children by the second marriage.

Dr. Harris died on March 4, 1861 in Philadelphia where he is buried. His death occurred on the Inauguration Day of President Abraham Lincoln for his first term as President. The following letter from the Commandant at Philadelphia to the Navy Department, informing them of his death, is quoted:

March 8, 1861.

Sir:

It becomes my duty to report to you the death of Surgeon Thos. Harris of the Navy, which occurred in this city, on the 4th inst. He was interred yesterday with appropriate Military honors.

I have the honor to be,
Very respcty yr obt servt
S. F. DuPont
Comdt.

The portrait of Dr. Harris shows a face full of character and strength. There is a shock of hair and the sideburns are curled as was the fashion at the time. The civilian coat collar and neckcloth of the 1830's are well illustrated. There is a description of him as a young man taken from a passport dated October 15, 1812, when he was one of a number of American prisoners from the *Wasp* captured after her action with the *Frolic*. Dr. Harris is described as: "Thomas Harris, Surg., 26 yrs., 5′10″, slender, oval visage, light complexion, black hair, blue eyes."

Note on Sources of Information

Much material concerning Dr. Thomas Harris was accumulated by Mrs. Alma R. Lawrence, formerly of the Naval Records and Library, Navy

Department, and was turned over to the writer who wishes to express his appreciation of Mrs. Lawrence's painstaking work as a collector of biographical material on this eminent medical man.

Information has also been obtained from the University of Pennsylvania School of Medicine, whose Alumni Records Office furnished facts about his graduation from the medical school.

Considerable information was obtained from Mr. Joseph Smith Harris of the Reading Terminal, Philadelphia, a descendant of Dr. Harris.

His record of naval service was examined in the files of the Personnel Division, Bureau of Medicine and Surgery, Navy Department, Washington, D.C. The Commandants' Letter Books, now in the National Archives, contain correspondence between the Navy Department and the Navy Yard at Philadelphia. Letters and reports of Dr. Harris regarding the school of general and naval medicine he maintained at Philadelphia were made to the Navy Department, and this correspondence is also in the National Archives.

Augustus Bozzi Granville: A Medical Knight-Errant

CHARLES F. MULLETT*

HOWEVER lost in limbo Augustus Bozzi Granville may be in 1950, a century ago it was quite another story. At that time he had been before the English public for thirty-five years and was to continue so for another quarter of a century. A physician, he was quick not only to promote his profession and spur on science, but to enter other lists as well. His literary career extended over sixty years and included theatrical, political, and travel pieces as well as a wide range of medical and scientific works. The latter were both popular and technical, embracing chemistry, physiology, sanitation, and the advancement of science. They reveal alternately a crusading zeal and a dispassionate outlook, but even the calmest papers show a purposeful quality.

Born Augustus Bozzi at Milan in 1783, the third son in nine children, he later, in 1806, on the strength of his maternal grandmother added the Granville.[1] After a varied education he received an M.D. degree in 1802 from Pavia where he had studied medicine and surgery under good men in a lively intellectual atmosphere; while there he also investigated the contemporaneous Genoa epidemic, a stimulus perhaps to a lifetime concern with epidemiology. Thereafter he traveled widely and profitably. He served as physician to the English embassy at Constantinople where he became convinced that inoculation with plague virus, a technique attempted occasionally during the preceding century, was mischievous. He also served briefly as a physician to the Turkish fleet and in Spain, broadening his clinical knowledge by closely observing various diseases. On returning to English service in 1806 he spent eight years with the fleet and ultimately became full surgeon to it. Thereupon he took on English ways in almost every particular. He added Granville to his name, married an English girl, joined the Church of England, was elected to several scientific and medical societies, and was for a time connected with the Manchester Infirmary. His appointment to the West India fleet was ended

* Columbia, Missouri.

[1] The chief source of information for his life is the *Autobiography of A. B. Granville, M.D., F.R.S.—Being eighty-eight years of the life of a physician who has practised his profession in Italy, Greece, Turkey, Spain, Portugal, The West Indies, Russia, Germany, France, and England. Edited, with a brief account of the last years of his life, by his youngest daughter, Paulina B. Granville.* London, 1874. 2 vols. His other pieces contain some incidental material; there is an excellent sketch in the *Dict. Nat. Biog.*

by illness, although he did undertake some diplomatic work in connection with South America.

On his return to England he lectured on chemistry in a fly-by-night medical school which soon folded up in disgrace. Anxious to redeem his reputation he went to Paris to study under Gay-Lussac, Cuvier, and Magendie in 1816–17. Although he concentrated on midwifery, he was tremendously impressed with Cuvier and the *Jardin des Plantes*. Back in London by the end of 1817, he was elected to the Royal Society and delivered some lectures. In 1818 he settled down to practise. Nonetheless, he maintained a close interest in continental developments, an interest nourished at frequent intervals by extensive travel.

He entered into the medical life of his adopted country by writing, speaking, and practising in a manner that could only gain him considerable attention. "Born to be a reformer," he could not remain silent in the face of crying abuses and deficiencies. He was especially upset by contemporary standards in midwifery, the inadequacies of the Royal Society, and the threats to the quarantine laws. It would, however, be a distortion to regard him wholly as a disturber of complacent men's peace. To bracket him with Lister or Bernard were foolish, but his specific enterprises were not contemptible: he brought back the stethoscope from a visit to Laennec and he introduced the use of prussic acid in chest affections; he wrote informatively on balneology; he defended the technique of counter-irritation.

Despite these achievements first attention goes properly to his reforming zeal and accomplishments; and here his concern with the Royal Society takes precedence. In 1836 he published *The Royal Society in the XIXth Century* wherein he sought only to disseminate knowledge; to this end he had his book privately printed and priced low.[2] He began with the presidential election in 1830, which had aroused the ire of James South (1785–1867), Charles Babbage (1792–1871), and others less vituperative.[3] Granville, unlike Babbage and South, had supported the Duke

[2] *The Royal Society in the* XIX*th Century; being a statistical summary of its labours during the last thirty-five years. With many original tables and official documents, (never before published) shewing the constitution of the society—the character of its fellows—its various proceedings—and pecuniary expenditure for "improving natural knowledge"; and a plan for its reform. To which are added, alphabetical and seniority lists of the fellows since 1800. (Arranged purposely for this occasion.)* London, 1836.

[3] See the present writer's "Charles Babbage: A scientific gadfly," *The Scientific Monthly*, 1948, 67, 361–371, which takes some account of Granville's analysis and notices the changes introduced into the Royal Society later on. For an enlightening study of the Royal Society, see Dorothy Stimson, *Scientists and amateurs*, New York, 1949.

of Sussex, the "mere lover of science, with great influence and patronage," over John Herschel, the "purely scientific" candidate. This support was literary as well as voting. In 1830 he had published anonymously *Reform in Science, or Science without a Head* in which he answered the charges of South and Babbage, the latter's tract possessing "no ordinary merit," and uncovered so many facts not germane to the immediate crisis that he withdrew the book from circulation in order to present a more complete account. This was now (1836) appearing in what amounted to a reissue of his preliminary work with notes, additions, and modifications, including the removal of all allusion to the 1830 controversy. The revision sought only the larger welfare of the Society and the advancement of science.

Showing neither the despair nor the vitriol of Babbage and South he clearly saw the weaknesses of the Society which for all its proud purpose and high record was the only scientific corporation "en arrière" of the nineteenth century. Its antiquated charters and imperfect statutes were not calculated to advance science, and its financial needs, which encouraged an influx of non-scientific members, delayed the emergence of "a truly and purely scientific body." Nonetheless, in 173 years it had published 5032 memoirs, some of them extraordinarily brilliant. Its 125 volumes permitted the Royal Society to face competition with any academy. On the other hand, as a society to encourage genius, reward merit, facilitate scientific intercourse, and inspire men to research, it lagged far behind many contemporaries. Its recent history proved that "too little reform is worse than none."

Granville's suggestions embraced administrative trivia as well as intellectual encouragement. He would limit elections to four nights a year and increase the time available for furthering natural knowledge.[4] His plea that outstanding fellows report on all papers of major importance was adopted, but his campaign to revise the methods of selecting fellows and administering the finances had little success. He likewise recommended stricter examination of papers, circulation of proceedings, greater availability of the excellent library, and consideration of awards. Although these items had received some attention, much remained to be done, and unless fundamental changes occurred, the new societies would shortly grow into mighty trees while the royal oak collapsed.

Granville's further suggestions, he repeatedly emphasized, contained

[4] This change, instituted in 1831, was withdrawn in 1835 on the ground that four nights were inadequate.

no assertions without supporting facts. The abuses flourished through ignorance; they would not remain if their existence could be proved and their removal feasibly suggested. The responsibility for the unsatisfactory and unpromising state of affairs belonged to the Fellows, but no one should assume the decline of science itself. For his part he intended to set forth the real state of science in England, the probable results of judicious reform, and an account of recent proceedings.

In assaying the state of science Granville analysed contemporary criticism. Babbage had weakened his book by harsh *ad hominem* reproaches, and his suggestions of reform were not altogether tenable. To charge university dereliction had little validity, since that had always existed. Must one assume, then, that science had always been in decline? Moreover, how much ardor had Babbage inspired among "young academicians" at Cambridge? Government dereliction was nothing new. Had junior lords ever been adept at science? Did government rewards mean everything, or anything? Indeed, the government had assiduously punished quacks and sought to improve public health.

Pure science had long excited only moderate interest. Although brilliant scientists had flourished in England, the emphasis upon utility and the lack of general philosophical interest in science prevented a continuously high level of achievement.[5] The art of interpreting discoveries belonged as much to the French and Italians as application belonged to the English. Although Englishmen loved to glorify their past, their achievements in pure mathematics and astronomy had for a century fallen behind the continental. Too many "jobbers" and too much petulance among true scientists abounded, yet this very petulance at least showed science to be alive. Actually the *quantum* of English science was as high as ever; many societies held to their old standards.

Compared to the French, German, and Italian academies the state of the Royal Society was piteous, as an anatomy of the fellows and their contributions since 1800 made clear. Clerical, army, navy, and legal members totaled about 250, and less than a tenth of these had contributed papers; with four or five notable exceptions these contributors had presented one or at the most two papers each. The situation was scarcely better amongst the 125-odd physicians and surgeons who, according to Granville, had lowered the Society's intellectual standards; although their total number of papers exceeded 200, the majority came from Sir Everard

[5] For instance, the study of natural history had always consisted of "nomenclatures and examination of species," to the neglect of its higher branches.

Home, and the remainder were distributed among 35 others of whom few contributed more than one or two. The remaining fellows, numbering about 375, included pure scientists and men about town; 55 had presented some 200 papers. Of the hundreds elected fellows since 1800, only 32 had "strengthened the domain" and "extended the boundaries of science"; the remainder comprised the increasing proportion of spectators. To make the situation worse, the elections exceeded the deaths, and the future held no hope so long as policies stood unchanged.

What of the contributions? Since 1800 about 1,200 memoirs had been submitted to an incompetent committee; 885 had been printed, but many of the remainder had been merely withdrawn or simply not printed. Few indeed had suffered outright rejection, and many unworthy papers had been accepted just as many unworthy fellows had been elected. The Society had been woefully remiss in setting up proper standards. Only those papers approved in writing by a member of the council had been published, it is true; but could an astronomer determine the merits of a paper on physiology?

In classifying the papers by fields, listing the total offerings, and calculating the percentage of acceptances, Granville not only shored up his criticisms but appraised scientific trends and achievements. Mathematics had clearly gone back, but physics, chemistry, and astronomy occupied a dominant place and maintained a high level. Medicine and surgery, by contrast, were distinguished by their low percentage of acceptances.

Medals, lectures, and finances also came in for analysis. The medal awards were sensible and well judged; some lectures were good, others farcical. Both medals and lectures suffered the limitations of their terms and therefore stood in need of careful administration. The finances cried out desperately for reform: far too much was spent on such trivia as publishing presidential addresses, regilding portraits, and pensioning a secretary. More publicity should be given to expenditures and more consideration should attend the publication of the Transactions. Indeed the whole administration needed more publicity since the existing government was an inefficient hierarchy, a doge and council of ten, characterized by secrecy and favoritism. The council chose its own replacements and dozens of its members had not contributed a jot to improving natural knowledge.

Criticism, it is true, had lately prompted the council to adopt some reforms along these very lines, but thorough-going revision had not taken place. The Duke of Sussex had been a devoted president until ill health

overtook him; for the good of the Society the president must preside. The council had improved library facilities, aided Faraday in his optical work, improved meteorological observations, and provided better quarters. On the other hand, it had blown hot and cold on Babbage's calculating machine and totally neglected several important items. The meetings of the Society were dull and trivial, all too frank a mirror of the few and feeble endeavors to advance science.

As a remedy Granville proposed different classes of membership, each limited in number, along the lines already charted by the British Association. The total membership could be held down to 600, since far too many fellows (781) had been elected since 1801. The membership should then be broken up into non-scientists (130), higher mathematicians (20), astronomers (30), mechanicians (40), experimental philosophers (70), chemists (70), natural historians (60), geologists (60), physical geographers (60), and medical men (60). Botany was omitted because no paper on that subject had been submitted in thirty years, and in any case its adherents could join the Linnean Society. To be placed in any bracket but the non-scientist the individual must have contributed to the advancement of his field; it was not enough to be merely a chemist or a geologist. The papers would be improved by their reference to the proper class where they would be rationally discussed by the competent instead of being noisily interrupted by the ignorant. Moreover, the Society should terminate the practice—soporific in its effect—of requiring the secretary to read all papers, and should emulate the British Association whose meetings were a brilliant contrast.

To bring about the desired reforms the existing statutes must be altered with respect to elections, publications, and finances. The mode of electing fellows through hackneyed recommendations and lobbying should give way to a plan whereby a prospective fellow should be proposed to the appropriate group of scientists by at least six members who knew him. Then candidates should be elected in order of seniority up to the allotted number. No previous lobbying and no arbitrary exclusion of a qualified, or equally arbitrary inclusion of an unqualified, person should be permitted. Membership emphatically should not be segregated according to the number of papers presented. In such circumstances the quality of papers would undoubtedly improve and the expenditures be more judiciously made.

Finally, for purposes of effective organization and the promotion of man's scientific estate alike, Granville recommended wholesale revision

of the scheme of meetings. A group committee, eight or ten from each group of scientists, should meet twice a week; a general committee, composed of five members from each group, should assemble monthly; the full body of fellows would convene once a year. By such means Granville thought to give full opportunity to those genuinely interested in the advancement of science without totally shutting off those whose contribution would be essentially that of spectators.

Granville's willingness to take up the cudgels for reform was repeatedly demonstrated both before and after he anatomized the Royal Society. Among other things he complained that English law did not distinguish between a quack's ignorance and a physician's error; he deplored the presence on the Commission of Lunacy of a man of no competence whatever; he charged Sir Robert Peel—whose possible elevation to the presidency of the Royal Society he vigorously protested in 1838—with supporting purer water and trained obstetricians only up to the point where his support might mean something. On no issue, however, did Granville take a stronger stand than on the quarantine laws. In 1819 the Levant Company, finding these laws vexatious and expensive, sought their repeal. To that end it invoked the assistance of anti-contagionists and enlisted the support of some members of Parliament who in turn secured the appointment of a select committee.[6] Granville immediately leaped to the defense of the laws and the doctrine of contagion with *A Letter to the Right Honourable F. Robinson.*[7] Six years later when the issue again arose he rode into the lists with *A Letter to the Right Hon. W. Huskisson, M.P., President of the Board of Trade, on the Quarantine Bill* (1825).

In the first letter he premised that when the government turned to medicine, physicians must testify. Since the report of the parliamentary

[6] *The Parliamentary Debates,* XXXIX, 424–26, XL, 1133–1134.

[7] *A Letter to the Right Honourable F. Robinson, M.P., President of the Board of Trade, and Treasurer of the Navy, on the plague and contagion, with reference to the quarantine laws; including the history of the plague conveyed direct from the Levant to five European ports of the Mediterranean, within the last six years: and also a detailed account of the experiments made on the subject of contagion of plague, by Deidier, Samoilowitz, Desgenettes, Dr. Whyte, Dr. Valli, Dr. Maclean, and Mons. Rosenfeldt,* London, 1819. Select Committees were appointed in 1819 and 1824. In his evidence in 1819 Granville described the characteristics of the plague, emphasized the value of quarantine, and insisted that goods could retain contagious matter a long time. In 1824 he took the bit in his teeth to relate his own wide experience in the Levant and to stress the need of depending on men familiar with the plague. He deplored the differences of opinion among the witnesses in 1819 as likely to jeopardize the prestige of the medical profession. Although still strongly devoted to quarantine principles he favored some easing of the requirements; circumstances should alter cases. *Report from committees: Expired laws; royal establishments; finance; poor; insolvent debtors; contagion;* &c., II, 1819, and *Second report from the Select Committee appointed to consider of the means of improving and maintaining the foreign trade of the country. Quarantine,* 1824. The 1819 testimony also appeared in *The Philosophical Magazine,* 1819, *54,* 417–439; 1820, *55,* 8–31.

debate had not specified the opponents of contagion, the public might conclude that the College of Physicians had approved relaxation of the quarantine laws, which of course was the reverse of the case. References to other diseases had further confused the issue, inasmuch as the plague alone was involved; whether other diseases were contagious or epidemic was irrelevant. So far as concerned the plague's origin, propagation, and communication, Granville conceded that it might have been endemic at first, but that it was later spread by contagion. The chief anti-contagionist, Dr. Maclean, had assumed contagion to be "an hypothesis, a phantom, a ghost walking in darkness," but he had succumbed to the plague by no other agency than contagion.[8]

History threw much light on the subject, but it must be used carefully; the plague of Athens so vividly described by Thucydides was an epidemic. Moreover, Maclean had argued that because Hippocrates, Celsus, and Galen did not use the word *contagion,* the idea itself was a "modern fabrication." He had insisted that the doctrine of contagion was only 269 years old, whereas Columella, Pliny, Q. Curtius, and Sallust all referred to contagion, and Boccaccio had graphically portrayed its character. Twenty centuries of history proved its reality; experiments and quarantines footnoted that proof.

The recent experiments with inoculation, if they proved anything, proved contagion. The Russian Samöilowitz thought that the plague would probably not twice attack the same person. Desgenettes, first physician to the French army, mixed inoculation and cleanliness and so rendered his experiment meaningless. Dr. Whyte inoculated himself and died of the plague. Had he failed to take it, the experiment would have proved nothing. Dr. Valli agreed with Samöilowitz, but his experiment of mixing cowpox and plague virus was worthless. Some indisposition followed, but what? A pomatum of this mixture sold at Constantinople was so dangerously ineffectual that even the lethargic Turkish police took action—putting the apothecary to death and the nostrum in the sea. A German, Rosenfeldt, who sought to disprove contagion by the use of amulets, irrevocably established their ineffectiveness by his own death from the

[8] Dr. Charles Maclean (fl. 1788–1824) investigated the plague in the Near East, testified before the 1819 Committee, and wrote extensively in defense of anti-contagion. He analysed the contagionists' arguments before the 1824 Committee in his *Observations on quarantine: being the substance of a lecture, delivered at the Liverpool Lyceum, in October, 1824* (Liverpool, 1824). His ideas on contagion are to be found principally in *Results of an investigation, respecting epidemic and pestilential diseases; including researches in the Levant, concerning the plague.* London, 1817–18, 2 vols.; and *Evils of quarantine laws, and non-existence of pestilential contagion; deduced from the phaenomena of the Levant, the yellow fever of Spain, and the cholera morbus of Asia.* London, 1824 (2d ed., 1825), but they run through all his numerous writings.

plague. Such crude experiments only heightened the value of historical testimony.

Although ancient writers had recognized contagion, segregation as a policy was first enacted by Justinian in 542 and not until the sixteenth century did men appreciate the full significance of quarantine. Even then the plague took a terrific toll and on occasion continued to do so for years to come, as the London Plague of 1665, the Marseilles holocaust of 1720, the Moscow visitation of 1771, and the Malta plague of 1813 attested. The defensive measures, dating from the creation of the first Board of Health at Venice in 1448, had, however, proven increasingly effective, and England's freedom from plague in 154 years of quarantine clearly established the value of quarantine and the reality of contagion. If the plague did not depend on contagion, such a policy could not prevent its appearance and development. Even though the imposition of the death penalty for its introduction made the source of the plague difficult to trace, its contagious character was not refuted. Only when "epidemic constitution" prevailed over "contagionism" did the plague flourish.

The anti-contagionists, in citing Dutch indifference to quarantine, disregarded the strict quarantine at Leghorn, the Dutch port for this purpose in the Mediterranean. Dutch consuls withheld passports from ships leaving an infected port; without these the ships neither were safe at sea nor permitted to land in Holland. Moreover, Holland with Russia was considering the adoption of a full quarantine code. If England abrogated her laws her ships must perform quarantine at every port in Italy, Spain, Portugal, and France, on the same footing as Turkey. The quarantine laws ought to be executed with the utmost vigilance if Englishmen were to be protected from this awful calamity.

In his second letter, Granville, aroused by some quarantine relaxation and the prospect of more, reiterated his earlier arguments and announced that England was now on a footing with Turkey.[9] Repeal introduced principles totally at variance with history and competent authorities. Leghorn had considered and Genoa had imposed a quarantine on English ships; other ports would probably imitate this example. The charge that "contagion" was a sixteenth century popish trick was totally false; quarantine was a sixth century, not a sixteenth century invention; Persia had had the plague, and quarantine alone had prevented worse conditions. Why should the Levant traders complain of regulations? Every trade had been

[9] This can be found in *The Pamphleteer; Dedicated to both Houses of Parliament*, London, 1825, *25*, 393–403.

subject to rules. Actually quarantine was more a matter of international policy than medical research, and every consideration warranted its retention.

Meanwhile Granville had already taken up another cause. In 1819 he inaugurated a campaign to reform the practices of midwifery, a cause which henceforth he steadily supported. Having specialized in midwifery at Paris, he made this the subject of two papers in *The Philosophical Transactions,* "On a mal-conformation of the uterine system in women; and on some physiological conclusions to be derived from it," and "A case of the human foetus found in the ovarium, in the size it usually acquires at the end of the fourth month."[10] Later on he published *Graphic Illustrations of Abortion and the Diseases of Menstruation* and *Obstetrical Statistics of the Industrial Classes of London.*[11] He elsewhere complained that "any broken-down washerwoman might call herself a midwife," since the College of Physicians, the College of Surgeons, the Society of Apothecaries, and influential physicians were alike indifferent.[12]

Valuable as were his technical pieces, Granville's most characteristic work was *A Report on the Practice of Midwifery at the Westminster General Dispensary, during 1818.*[13] Drawing almost wholly from his register of admissions and daily journal, he praised dispensaries as among the most useful of charitable institutions. English in origin, they had developed out of the philanthropic spirit of the eighteenth century and had so far justified themselves that other countries had followed suit. London had twenty-three, besides hospitals and other medical charities.[14] Some,

[10] These appeared respectively in 1818 and 1820; in 1825, he contributed "An essay on Egyptian mummies; with observations on the art of embalming among the ancient Egyptians."

[11] *Graphic illustrations of abortion and the diseases of menstruation. Consisting of twelve plates from drawings engraved on stone, and coloured by Mr. J. Perry, and two copper-plates from the Philosophical Transactions, coloured by the same artist. The whole representing forty-five specimens of aborted ova and adventitious productions of the uterus, with preliminary observations, explanations of the figures, and remarks, anatomical and physiological.* London, 1834. The *Obstetrical Statistics* came out in 1861.

[12] Sir Henry Halford (1766–1844), to whom Granville dedicated his work on abortion, believed midwifery "unworthy of the notice of gentlemen of academical education." This fashionable London physician was more distinguished for his practice than his learning. Known to many as the "eel-backed baronet," he presided ineffectually over the London College of Physicians, 1820–1844.

[13] *A Report on the practice of midwifery at the Westminster General Dispensary, during 1818; including new classifications of labours, abortions, female complaints, and the diseases of children; with computations of the mortality among lying-in women, and children; and the probabilities of abortion taking place at different periods of pregnancy, &c. &c. with select cases and formulae.* London, 1819.

[14] The first appeared in 1757; the second, the Westminster Dispensary itself, in 1775; and others followed in 1777, 1778, 1780, 1782, 1785, 1786, 1787, 1789, 1792, 1793, 1801, 1810, 1812, and 1816, at the rate of one, two, or three a year. Some were found solely for the relief of lying-in women, and eight had an attached practitioner in midwifery. London also had four lying-in hospitals, founded respectively in 1749, 1750, 1752, and 1765.

it was true, had only trifling importance, but all contributed to medical well-being.

The Westminster Dispensary, the first to enjoy the Royal patronage, more than justified its distinction; it served over one-third of the metropolis, and a physician or surgeon was readily available. Were its work better known—and Granville intended to remedy this matter—it could count on more charity and thus do more good. Although the four lying-in hospitals performed fine service, the red tape embarrassed the patient. The Dispensary physicians and midwives were delivering a far larger number without so much formality.

Along with such reflections Granville incorporated pertinent data on pregnancies, miscarriages, disease, midwives, and prescriptions. He described conditions of labor, tabulated mortality, and calculated that out of 623 recent pregnancies 569 had fallen between 20 and 40, only 7 below 20, 46 from 40 to 50, and one at 52.[15] The lower classes generally opposed mechanical assistance in labor, a situation he had attempted to improve. Miscarriages were very numerous, occurring as often in the palace as the hovel. In regard to midwives Granville emphasized improvement in training and control. The Westminster Dispensary had no regulations prior to his appointment, but now the midwife was required to remain on the job. If difficult labor, unnatural developments, and post-delivery pain occurred, he should immediately call a physician.

Much more technical and presumably prepared for his fellow physicians was *Graphic Illustrations of Abortion*. Here he stressed his experience and explained that the drawings, executed under his direct superintendence, rivaled and even surpassed foreign plates. He had selected his specimens for their practical value and justified his work on the ground that earlier works, especially those of Hunter, Soemmering, and Denman, were not generally available. A prolegomenon defined terms and outlined contemporary knowledge in 102 propositions. The subject, said Granville, had aroused widespread interest, but less in England than elsewhere. It depended upon physiology which had made great strides in France and Germany through the theories and experiments of first-rate scientists, whereas Englishmen, still clinging to older assumptions, had made few contributions other than those of a limited practical nature. His own knowledge came from French and German sources to which he made constant ack-

[15] This last occurred after an eleven-year interval and was the 16th child. He also noted that French women generally bore their children at a younger age than English women.

nowledgment along with the suggestion that his readers explore the same materials.

In nearly all of Granville's medical pieces the essential viewpoint is a lively and consistent devotion to public health. Nowhere did this appear more clearly than in *The Catechism of Health* which in many respects was his most characteristic, though not his most interesting performance.[16] He recalled his wide experience and stressed his concern with health, length of life, and moderation. He discussed infancy—its diet, clothing, and cleanliness—the need for good air, exercise, sleep, food, drinking, and smoking. He wanted not merely health but beauty and symmetry. He opposed indiscriminate taking of medicine and praised a simple and regular regimen. An appendix, "Undisputed Laws which Govern Diseases in General," which classified diseases, defined contagion and infection, and summed up preservative measures merely reprinted his conclusions in the *Letter to F. Robinson.*

The contemporary threat of cholera gave that disease extra attention. It might come suddenly and flourish anywhere. Its history proved its noncontagiousness. Thus the precipitate quarantine action of the London Board of Health had needlessly excited panic; not one member was acquainted with the disease. Moreover, the quarantine measures promoted by the *Quarterly Review* were absurd. In Sunderland the authorities had applied quarantine to no avail. The cholera was infectious and epidemic, the product in part of the "epidemic constitution"; to exaggerate its dangers would only dispose anyone to its ravages. Its symptoms appeared everywhere—head, bowels, muscles, heart, chest, and the nervous system. Drugs had no real efficacy, though alkaline drops and laudanum were soothing; the victim should keep warm and use a counter-irritant. Bleeding had value in the early stages. For prevention and precautions, Granville recommended a good diet, proper clothing, temperance, cleanliness, and ventilation.

The reference to a counter-irritant recalls that he later promoted this technique in *Counter-Irritation: its Principles and Practice.*[17] The therapy of revulsion, he maintained, was coeval with man's history and as ubiqui-

[16] *The catechism of health; or plain and simple rules for the preservation of health and the attainment of a long life. To which are added, facts respecting the nature, treatment,* and *prevention of cholera.* London, 1931 (4th ed., 1832). Granville had now become an anti-contagionist, at least in regard to cholera. For an informing survey of this doctrine see Erwin Ackerknecht, "Anticontagionism between 1821 and 1867," *Bull. Hist. Med.*, 1948, *22*, 562–593.

[17] *Counter-irritation: its principles and practice, illustrated by one hundred cases of the most painful and important diseases effectually cured by external applications.* London, 1838.

tous as man himself. It had cured neuralgia, tics, ague, epilepsy, apoplexy, sinus congestions, asthma, tetanus, headaches, toothache, rheumatism, lumbago, swellings, sore throat, pneumonia, consumption, pericarditis, gout, paralysis, palsy, sprains, falls, boils, and pimples. Indeed a great many disorders, hitherto considered as incurable, or difficult of cure, might be successfully cured without recourse to internal remedies.

Another topic that gave Granville pause, and produced a book, was sudden death, by which he meant apoplexy, paralysis, and unspecified fatalities.[18] He found that certain ailments had received great attention owing partly to spectacular advances in physiology and chemistry and partly to a popular appetite for such items. On the other hand, some, though well treated, had not excited popular attention, and still others had been almost wholly neglected, a situation which prompted Granville to snipe at fashionable practitioners, their fees, clients, and indifference to significant diseases. He based his work upon data in the office of the Registrar-General, and concentrated primarily on younger rather than older victims. The data showed a steady increase in deaths by apoplexy and paralysis. Fewer males than females succumbed to paralysis, and in apoplexy the reverse was true, though the figures needed more scrutiny. Apoplexy and paralysis destroyed more in the flower than in the sere and yellow; both were more frequent in the country whereas sudden death was more common in the city. The frightening child mortality, which Granville strongly suspected often to be murder, came in for emphasis, as did the indifference of people to death and the corresponding indifference of death to people.

Superficially in contrast to his reforming pieces were some travel narratives which mixed medicine with social comment and aesthetic description. A journey to St. Petersburgh produced an extensive and informing journal.[19] He found the medical profession good at Ghent, less so at Brussels. He described the springs at Aix-la-Chapelle, the ailments for which the waters were effective, and the care and caution which clients should use. He admired German scientific societies and museums, and observed that although the English excelled in travel, resources, and prestige, their museums excited only a blush.

Concerning St. Petersburgh he spoke freely of its climate and diseases. He praised the baths. He described the Academy of Sciences and the Botanic Garden. He found Russian medicine less experimental than the Ger-

[18] *Sudden death.* London, 1854.

[19] *St. Petersburgh. A journal of travels to and from that capital; through Flanders, the Rhenish Provinces, Prussia, Russia, Poland, Silesia, Saxony, the Federated States of Germany, and France.* London, 1829. 2 vols.

man, less effectual than the English, less bold than the Italian, and less "expectant" than the French, and thought the Russians too prone to use drugs and none too careful in that use, but he approved their hostility to quacks. The many foreign influences had unfortunately prevented uniform opinion and *esprit de corps.*

Not altogether dissimilar was *The Spas of Germany.*[20] This, the first work on the subject in English, covered every phase of taking the waters —the environment, climate, accommodations, waters, itinerary, and anecdotes. All the principal and most of the lesser spas were fully described as to appurtenances and the quality and virtues of the waters. In the preface, "popular considerations on the use and power of mineral waters," he deplored English ignorance of foreign spas and the prevailing medical prejudice and scepticism, and warned against mistakes arising from chemical ignorance. Mineral waters stimulated all the reactions that marked the cure of any ailment; nature had a use for everything. Their temperature especially was a major factor. The waters, in aiding perspiration and other excretion, at once invigorated and relaxed; and the pleasant social environment enhanced their virtues. Although cure was the first object, prevention and mitigation were not far behind. Because waters could aggravate as well as benefit, people must watch the seasons, the time of day, dress, exercise, and diet as well as the peculiar character of the water. To facilitate the dietary regimen Granville listed the proper and improper foods, wherein the avoidance of stimulants appeared the chief characteristic.

A few years later he followed this with the *Spas of England* which included "Popular Considerations on the Nature and Use of English Mineral Waters."[21] Because the *German Spas* had encouraged Englishmen to go abroad he had been chastised; now he sought not only to persuade them to stay at home, but to encourage foreigners to come to England. He also wished to refute lukewarm or even hostile physicians. Moreover, so many works had appeared that balneotherapy was likely to be overdone.

German waters differed principally from English waters in their chemical composition. They abounded in carbonic acid gas which vastly improved their taste; no English waters possessed anything like the same amount. In consequence they were salty, bitter, soapy, astringent, and even nauseous. By increasing the solvent power of the water the gas also benefited the consumer. For instance, Tunbridge Waters equalled the German Bruchenauer in steel, but having by comparison only a trifling amount of

[20] *The Spas of Germany.* London, 1839. (2d. ed.)

[21] *The Spas of England, and principal sea-bathing places.* London, 1841. 2 vols. in 3.

carbonic gas, were far less tasty and beneficial. Moreover, many English waters lacked valuable salts, and what they had were inferior. On the other hand, several springs possessed a happy combination which for certain disorders made them equal if not superior to their German equivalents. Nitrogen was claimed for most English springs, but this might not be important.

Granville attributed the eclipse of English spas to disappointment, commercialization, doctors, and expense, which contrasted sharply with German conditions. No country had more "water" literature, but much was deficient in chemical, physiological, and medical knowledge. Too often it was eulogistic, and only recently had a critical and informative note appeared. Men must remember that mineral springs were the product of nature, the medicinal prescription of a perfect and constant laboratory. To expect benefits from bottled water, sent some distance, was foolish; the very corks might extract its virtue. Moreover, the visit to the spa involved much more than drinking and bathing. The trip, accommodations (often woeful), excursions, recreations, and changes in air, diet, and way of life were scarcely less beneficial.

Following these observations Granville surveyed the individual spas much as he had in his earlier work, although in general he adopted a more critical tone. He coolly analysed one, praised another for certain virtues, attacked a third for its meager accommodations, and dismissed a fourth for the utter neutrality of its waters. He also had good things to say of sea bathing and the seaside resorts. All in all, he provided a full catalogue of English spas, the ailments each would benefit, the temperature, mineral ingredients, and peculiar merits or demerits of their waters, and something of the social environment to be found there. Withal he found space to applaud the care of the insane in Lincolnshire, to notice that English physicians were wont to treat the symptoms and not the disease, and to view railways as something less than the vanguard of civilization; but mainly he enriched English "water" literature in a manner at once critical and informative.

Although the samples of his output here summarized illustrate Granville's interests, the annexed bibliography[22] accents his infinite variety. If some writings are relatively unimportant, all attest his comprehensive and constant enthusiasm for good health. From first to last he sought to improve man's medical estate. He would encourage research, introduce new techniques, strengthen the whole regimen, and remove the very causes of dis-

[22] At the conclusion of this article.

ease. Mere popularity had no place in his hygienic hierarchy, yet even his sharpest attacks were never querulous.

Apart from his reforming zeal his chief characteristic was unremitting energy. In addition to his published works he had others near completion. *The Report on Midwifery* and the *Letter to F. Robinson* advertised "Memoirs on the Present State of Science and Scientific Institutions in France" as in the press; the *Graphic Illustrations* was intended to accompany a 500-page octavo volume "On Abortion and the Diseases incidental to Menstruation" to be published without delay. He edited the *Medical Intelligencer* and the *London Medical and Physical Journal;* he was president of the Westminster Medical Society and vice-president of the British Medical Association; he was active in the Royal Institution and other societies; he founded an infirmary for sick children.

Although highly esteemed in many quarters, he did not lack critics. He was passed over for a professorship of midwifery at London. Many of his works received scanty attention, and some were mercilessly lampooned. The *Quarterly,* which he derided in his work on the Royal Society and in his account of cholera, ridiculed the *Journal* of the St. Petersburgh trip for its title-page loaded with initials, titles, and degrees, for the great mass of irrelevant, inaccurate, uninteresting, and childish content, and, not least, for the author's foreign origin and readiness to admit foreign superiority in some matters. The *Catechism* excited a veritable carnival of jocularity. The reviewer professed to believe the work nothing but a penetrating satire on medical writers. The barrage of titles and degrees parodied their pretensions; the "4th edition with additions," when there had been no second, no third, and no additions, excited only admiration. The work which inspired it was by a German, translated and published in England as late as 1828. So great was the inspiration that parallel quotes were cited in evidence. Finally, the reviewer, disagreeing with the theories and recommendations concerning cholera, concluded with a hyperbole of praise and gratitude for this highly entertaining exposure of the medical author—his pretensions,, deceptions, plagiarism, and pontifical errors.[23]

On the other hand, in reviewing the quarantine controversy the *Quarterly* accounted Granville the foremost advocate of the extreme contagionist position, and, while not agreeing with that position, did not deny its validity.[24] Much more positively *Blackwood's* and *Fraser's* praised his *Spas*

[23] *Quarterly Review*, 1829, *39*, 1–29; 1832, *47*, 394–407. It is undeniably obvious that Granville did spread himself in listing all his honors.

[24] *Q.R.* 1822, *27*, 524–553. The contradiction in the position of the *Quarterly* between 1822 and 1832 testifies to the fluctuating attitude toward contagion generally.

of England and recalled the excellence of his *Spas of Germany.*[25] Judiciously they pointed out an occasional error, but on the whole they found the volumes highly informing and diverting, valuable for social as well as medical data.

In sum, Granville contributed to his time an awareness of certain major weaknesses. He was willing to stand up and be counted, and his analysis of the Royal Society, defense of contagionism, campaign for medical reform, and exposition of specific treatments were in each instance to his credit. He rushed in where scholars feared to tread, and the good he accomplished far outweighed any bad. He stood for nothing harmful, and his particular type of advocacy could scarcely have antagonized more conservative minds. Whether or not Granville specifically influenced policy, many of the reforms he supported came quickly into effect. No doubt many men independently shared in bringing influential figures in church, state, law, medicine, and the universities to support reforms and incorporate them in formal enactments. Certainly the organized promotion of particular policies, the public health measures, and the extended activity of administrators owed much to the unrelenting agitation of such men as Granville. In social and clinical pathology alike he was *au courant* with, not *en arrière* of the most progressive views of his time; and with great skill he insisted that every medical problem was in the final analysis a social one as well.

Lists of the Several Works and Papers Written by Dr. Granville[26]

1812 Critical Observations on Six of the Principal Characters Represented by John Kemble at the Theatre Royal, Manchester.

1813 L'Italico: a Literary, Scientific, and Political bi-monthly publication. Supported by the English Government.

1814 Il Patriota Italiano.

An Appeal to the Emperor of Russia on Italy. Written in three languages.

1817 An Account of the Life and Writings of Baron Guyton De Morveau, the Reformer of Chemical Nomenclature.

1818 Report on the Practice of Midwifery at the Westminster General Dispensary.

1819 Further Observations on the Internal Use of the Hydrocyanic (Prussic) Acid in Pulmonary Complaints, &c.

On the Plague and Contagion, With Reference to the Quarantine Laws: in a Letter to the Right Hon. F. Robinson, M. P.

On a New Compound Gas From Dropsy. Read at the Royal Society.

1820 An Historical and Practical Treatise on the Internal use of Hydrocyanic Acid in Disease of the Chest. Second Edition. Much enlarged.

[25] *Blackwood's* 1841, *49*, 725–733; *Fraser's*, 1842, *25*, 182–191.

[26] As listed in his *Autobiography*. The list actually should be checked against the British Museum catalogue and similar guides for exact titles and dates. Granville also contributed numerous pieces to the *Philosophical Transactions* and other periodicals.

A Case of Protracted Headache Cured by Carbonate of Iron.
Reply to Professor Brand's Critique on Prussic Acid.
1823 Progress of Medical Science in the Year 1822, English and Foreign.
1825 An Essay on Egyptian Mummies, with Observations on the Art of Embalming Among the Egyptians, &c.
Letter to the Right Hon. Mr. Huskisson, M. P., President of the Board of Trade, on the Quarantine Laws.
Evidence Before Parliament on the Thames Improvement.
1828 St. Petersburgh: a Journal of Travels to and from that Capital through Flanders, Prussia, Poland, Silesia, Saxony, &c. 2 vols.
1830 Reform in Science, or Science Without a Head, and the Royal Society Dissected.
1831 The Catechism of Health, or Simple Rules for the Preservation of Health and the Attainment of Long Life.
1833 Graphic Illustrations of Abortion, with Prolegomena of the Development of the Human Ovum.
1835 Report on the Thames Improvement Company, with many original Memoirs.[27]
1836 The Royal Society in the 19th Century Being a Statistical Summary of its Labours During the last 35 years.
Report on Martin's Plan for Improving the Thames, &c.
Report of a Journey Through Central Europe for Agricultural Inquiries.
1837 The Spas of Germany. 2 vols.
Report on Arsenicated Candles.
Medical Reform: being the First Oration read before the British Medical Association.
1838 Counter-Irritation, Its Principles and Practice; illustrated with One Hundred Cases cured by External Application.
1841 The Spas of England and Sea-Bathing Places. 3 vols.
1843 The German Spas Revisited.
1846 Kissingen, Its Sources and Resources.
1848 On the Formation of a Kingdom in Italy. First Letter to Lord Palmerston.
1849 The Italian Question. Second Letter to Viscount Palmerston.
Letter to the Duke of Wellington on the Nelson Column.
Description of a Rostral Column to Lord Nelson, with a Design.
1854 Sudden Death!
1858 The Sumbul, A New Asiatic Remedy.
1859 The Mineral Springs of Vichy: a Sketch of their Chemical and Physical Characters and of the Efficacy in the Treatment of Disease.
1860 Dr. Todd and the Late Member of Ashton.[28]
1861 Obstetrical Statistics of the Industrial Classes of London.[29]
1865 The Great London Question of the Day: Sewage v. Gold.
1874 Autobiography.

[27] The B. M. lists only *Doctor Granville's Report to the Directors of the Thames Improvement Company* (1837).

[28] *Dr. Todd and the late member for Ashton* [*Charles Hindley*]. *Fatal effect of the stimulating treatment of disease* (2 ed., 1860). Dr. Robert Bentley Todd (1809-60), an Irish physician of high repute and wide practice, believed in the desirability of administering alcoholic stimulants at short intervals during a fever bout.

[29] The title of this is: *On certain phenomena, facts, and calculations, incidental to or connected with the power and act of propagation in females of the industrial classes in the metropolis; derived from the experience of two lying-in institutions* (1860).

A Link with Jenner—Postscript

SAMUEL WOOD*

IN the Library of the Royal College of Surgeons of England a parcel of manuscript material recently came to light whose provenance has not yet been ascertained. One of the items is a MS. of 46 leaves entitled "Memoirs of some particulars of the Life of Edward Gardner interspersed with Observations on Manners Taste and Literature, including a development of the Chattertonian Controversy Anecdotes of literary Men and original Correspondance with eminent Characters." The book started life as a ledger for keeping timber accounts and is headed Frampton on Severn. Glos. "Bought 1777" on the grey, watermarked front cover; "Timber Sold" on the back cover. The accounts sheets have been cut out, leaving some plain sheets of the original ledger for Gardner to write his "Memoirs" to which he had added, and filled, a gathering of paper bearing in the watermark the date 1807. On the front cover is a gummed white slip of paper with perforated edge on which is written "By Mr. E. Gardner, Jenners friend for more than thirty years. Born 1756. Book commenced 1810. Paper dated 1807."

The manuscript is interesting for its first-hand notes on Jenner, Chatterton, and Worgan,[1] the youthful genius who undertook the tuition of Jenner's children before he was sixteen years of age. At this time he had already written a "centenary" of sonnets and by unceasing perseverance had acquired a wide knowledge of classical literature. He stands out as a public eulogist of his patron Jenner and wrote a series of "Essays on Vaccination" in support of the new practice which appeared in the *Gentleman's Magazine* of 1808–9 under the nom de plume "Cosmopolitos." He began his investigation in sceptical mood, for he regarded the vaccination discovery as something on the same level as the Cordial Balm of Gilead and the Restorative Drops. He made "the most scrupulous inquiry" before he was driven to believe that vaccination really achieved the results claimed for it by enthusiasts. As he was not a medical man, he introduced the writings of authoritative men in support of his opinions. In spite of the numerous cartoons and "scare-sheets" of the time he asserted that no "new" diseases had arisen as the result of vaccination. But he disagreed with the writers who thought the protective qualities of vaccine would fail in a few

* London, England.

[1] *See* A link with Jenner. *Ann. Med. Hist.*, 1936, *8*, 433–441.

years and that the constitution might again become susceptible to the smallpox. He called this "a curious apprehension, unphysiological, and directly opposed to pathology." Dr. Jenner, he said, had vaccinated an immense number of people with his own hand during an uninterrupted period of ten years and diligent inquiry had failed to discover a single instance in which any of his patients was subsequently affected with the smallpox. He was probably thinking of the farmhands of Gloucestershire and lost sight of the fact that their occupation would render them liable to re-inoculation.

Worgan also wrote a eulogy in thirty-five Latin verses of John Ring, a surgeon who attended the lectures of Percivall Pott and of John and William Hunter. "Honest John Ring," as Jenner called him, devoted much of his professional life to the cause of vaccination and wrote a book of nearly three hundred pages to refute a pamphlet by Dr. Moseley whose first two efforts to convince Parliament and public of the inefficacy of vaccination had failed but who persisted in a third attempt. Of him Ring says:

> "Authors, when damn'd, once died like other men,
> But our damn'd author lives, and writes again."

Worgan's writings, which comprised letters, poems, and sonnets, made up a book of 310 pages published posthumously by William Hayley in 1810. Included therein is an "Address" in heroic verse which was printed and presented to the Jennerian Society at the annual meeting in 1808.

Worgan's sight failed early and before his eleventh year he handled his spectacles with the composure of an aged man. His heart was set on the ministry and accordingly he was entered at a clergyman's school where in the short space of a year and a half he acquired such knowledge of Greek and Latin that he was able to read with ease books of the highest rank. He was so sure of his own judgment that on one occasion he intercepted a popular book, *Dr. Gregory's Legacy to his Daughters,* which was on its way to a young woman of his acquaintance. "It is replete with frivolities," he said. "The amusements of the stage are not innocent and it is strange that the most fruitful sources of immorality should be so warmly eulogised in this work"; and more in the same strain. The break-up of a love affair gave him the opportunity for advising the young lady regarding her soul, her companions, and what she should wear! In his farewell letter he wrote, "Seek therefore, my beloved, the shades of solitude, and cultivate serious reflection and contemplative thought. When we are most retired from the world we approach nearest to the happiness of Heaven." A repulsively good boy!

A strain of morbid piety and priggishness runs through Worgan's writings and renders them somewhat tedious to the modern reader though, in justice, it must be recorded that his parents were both highly religious people. His plans to enter the ministry and to attain literary eminence were not to be fulfilled for while in Jenner's service two attacks of typhus fever so reduced him that all the care bestowed by his patron could not prevent his decease on 25 July 1809. Jenner's sympathy is manifest in a note to a friend. "Your letter came too late for me to make any observations upon what you drew up for insertion in the Bristol paper respecting our dear departed friend. It must be some consolation to his surviving relations and friends that his name will not be forgotten. . . . I beg you will present my best wishes to Mrs. Worgan and tell her, unless she particularly wishes it, I should be sorry to put her to the expense of a ring, but yet, I should like to have something in remembrance of poor John, a book would be acceptable. The editor of the *Cheltenham Chronicle* who was the intimate acquaintance of poor Worgan, has paid a just tribute to his memory in the paper of yesterday."

Gardner held a high opinion of Worgan and his tribute is as follows:

> Running through the career of my literary acquaintance I must not, I cannot, nor should I forget the late amiable youth John Dawes Worgan of Bristol who died in that City in July 1809. I saw him for the first time at my own house at Frampton in the autumn preceding. He was then Preceptor to the children of Dr. Jenner in the Classics and by this means he was introduced to me, a more ingenious nor a better informed Young Man (Boy rather, not then having completed his nineteenth Year) I never conversed with. Rich in classical erudition, deeply read in History, well acquainted with the French and Italian languages, he was almost a Phenomenon. His poetical abilities may be appreciated by the specimen of his productions which has appeared in a Volume published since his Death.
>
> Worgan in my opinion equals any Poet this Kingdom has produced, and I would not be understood to make any allowance for his Juvenile Years. Chatterton (whom as I have before observed I well knew) ranks very far beneath him even supposing him to be the Author of the Poems attributed to Rowley.
>
> With this amiable Youth equally distinguished for his Genius and Learning I had hoped to pass many Years in that social intercourse which links Mind to Mind. In my comparative old age I could not reasonably have expected to have enjoyed his Friendship many Years. I was, when we first became acquainted, Fifty three, he only Eighteen. Yet Poor Boy he is Gone. The silent Tomb incloses him, and I am still living. How soon I may follow him Providence only knows.
>
> I was happy to receive from Worgan in the course of our very short acquaintance nearly a dozen of Letters, these being wholly of a literary Nature will appear in the course of this Volume. Several of his sonnets which he communicated to me in M:S will also appear. I perceive they are not printed and I think it wrong to deprive the World of one line of so distinguished a Genius.
>
> Worgan's Ideas of the poetical Character and of the Merits of our most eminent

English Writers in Metre were perhaps somewhat singular, but I must confess that I cordially agree with him in almost all his opinions. He was not warped by the practice of the new schools particularly the Bristol and the Scotch evidently formed upon the recent one of Germany. He adhered to the antient Models of Greece and Rome. It would be the ostentation of Philosophy to enter into the point of Critical discussion in the present page. Something perhaps may be adduced upon the Subject when I shall attempt to appreciate the Merits of the Poets posterior to Milton.

I must beg leave here to transcribe some lines as a tribute to a singularly eminent Youthful Genius. They "sprung from the Heart and faithful to its fires." I must Preface these lines by Observing that they are extracted from a Poem which perhaps may in future be published entitled "The Effusions of Feeling."

TRIBUTE TO THE MEMORY OF JOHN DAWES WORGAN

I knew thee dearest Youth and all who knew
Must surely love thee, if ingenuous truth
(For Truth and fervent Piety were thine)
Firm were thy Friendships and thy gen'rous heart
Spurn'd the World's vile and bitter base controul
And mingled with integrity of Mind
Did highest Genius o'er thy Fancy Wave
It's fairest flowers, High Poesy for thee
Her brightest flag unfurld. In sonnet sweet
How soft You sung, unrivalled by the host
That Britain e'er produced. Her fav'rite Son

But still most amiable ingenious Youth
Though the rich scenes of Nature to thy view
Open'd their various stores. Tho' fancy wild
Rov'd o'er the Mountains top, and Valley deep
Bending all Nature 'neath thy Muse's Wing
Yet still a higher nobler Meed is thine
When Meek Religion o'er thy polished page
Sheds it's soft lustre, how the pure Heart glows
Melts in seraphic bliss, when at thy strain
Celestial strong congenial ardors glow
Oh! thou wert all that Fancy could create
In the ideal fields of Verse to rove.

Poet divine in early days enshrined
On that pure Altar, which to all deny'd
But Heav'n-born sons, for them the bright stars glow
For them the lucid moon her rays imparts
For them the splendid Sun its beams displays
For them all Nature yields its varied Charms
The mountain snow-topt lifts its Massy head
The daisied Valley, and the spangled lawn
The Robin singing from the bending spray
On Philomela's note at Close of Eve
Pouring her Varying Melody around

All—All were Thine. Thy ardent Genius caught
All that Religion,—All that Nature gave
Dear Youth farewell, ah! snatch'd in early life
Long before Manhood crown'd thy ripening years
The bud of Genius in it's early day
Whilst Yet beginning to shoot forth its bloom
Ah! wither'd by the Frost of dire disease
Fell to the Earth, and lies beneath the Sod
Cold in the grave You lie to hopeless love
A youthful victim—but we rest secure
Thy Soul reposes with thy Father God.

Well I remember dear beloved Youth the last sad interview I had with thee When at our parting Moment thou didst grasp My hand in thine "For ever in this World Dear Friend farewell to God's kind Providence I you commend" The gushing tear then spoke Flowing adown the Cheek the Ardent soul sincere.

In the Year 1780 I fortunately became acquainted with that Luminary in Philosophy and in the Art of Medicine Dr. Edward Jenner, since the celebrated Discoverer of the Vaccine Inoculation. I was so much flattered by him that I ranked among the first friends of his early Youth. I reflect upon the hours, the days, the weeks, the months and the Years which I spent in his society as the happiest in my life. How often have I dwelt with silent attention upon his profound remarks upon various subjects of natural Philosophy particularly those of a Physiological kind. And how frequently have I witnessed his Skill displayed in the various parts of his profession.

Honored with this Gentleman's Friendship I have passed more than thirty Years of my Life, an intercourse equally instructive and delightful. No Man I should suppose has known Dr. Jenner more than myself, and to know him is to know every thing that is excellent in human Nature. His Skill in his own profession has been long acknowledged and has been by the learned World justly appreciated. The Genius of Jenner was formed by Nature for higher pursuits than the Medical Art. He was the Poet. "Poeta nascitur" That Gift divine so rarely bestowed upon Man was given to him, and 'though his unremitting Arder in his pursuits of Natural History and his attention to the duties of his profession prevented him from the frequent exercise of his talent for Poetry, yet the fire in some measure extinguished but not smothered sometimes burst out. He was peculiarly happy in Epigram. Some specimens of his Metrical Genius will appear as I proceed.

Dr. Jenner, so eminent as he is by his natural and acquired Endowments, by a sort of singular composition of Character has not lost any of those soft aminities which polish the surface of human-life. In him was always perceived the Gentleman of polite and elegant Manners which gilded over the profundity of his Philosophical remarks. Nothing harsh was ever found in Jenner, and were I inclined to censure any part of his Conduct it would be his too ready acquiescence with the sentiments of some of his associates, however absurd, but this was the acquiescence of Philanthropy.

If we examine the History of illustrious Characters which have adorned our Planet we shall frequently find that great in their several Walks as they were Yet they present some dark shades upon the Picture of their well-earned fame. Newton was sore almost to distraction by the unremitting Violence of Hook. The savage roughness of Johnson is familiarly known. Many more instances might be adduced in the history of eminent Men but Jenner forms a contrast. As the discoverer of the Vaccine inoculation we behold him for a series of Years unremittingly pursuing the grand Object which he had

in view undismayed by prejudice and only smiling at the assaults of ignorance. Shielded by his good sense from the shafts of envy he consigned to Posterity (that certain Judge of Merit in every branch of science) the Eulogium of his Genius and labors.

With this distinguished Character I have in the social intercourse of uninterrupted Friendship spent more than thirty Years of my life, in his Company I have experienced some of the happiest days of my existence. He was my guide, my Counsellor and my Friend. Language can go no further.

LETTER FROM GARDNER TO JENNER

Frampton Dec. 10, 1810

My dear Friend

I duly received your kind letter inclosing the Vaccine matter. We were so hard pressed by the insidious Enemy as to render it prudent to fire more Guns than one. I wrote to Dr. Baron, H. Jenner Mr. Fry of Dursely and Yourself and I have now received matter from all. Dr. Baron's was the most scanty consisting only of 2 points. In his very polite letter to me he heavily complains that the tardiness of the people prevents a regular supply of lymph at the County Hospital, a disgrace he says to the understanding and feelings of the neighbourhood.

We get on rapidly in V.I. I will attend to Your Caution of not rashly exposing any to Variolous contagion unless I am certain from an inspection of the Arms that they have previously undergone the true C.P. I have inoculated 3 according to Your Plan. . . . I was offered by Mr. Clifford the vaccination of the parish but I declined as there were two surgeons in the place. The Job will be little short of £20. 0.

Depend upon it every care shall be taken respecting the interest and the Fame of vaccine In^{n} as it respects this parish in the present Instance. . . .

[Gardner here refers to his projected autobiography] I have interspersed the history of my early Years with Occurrences which striking the feelings of Youth give their performance somewhat the air of a novel. The pleasurable, the raptrous days, I passed at Berkeley in the season of our first acquaintance still vibrate upon recollection on every nerve of my Heart. How often have Your honored brother Yourself and me paused over the Polyanthus border delivering our sentiments on the merits of its Inhabitants—but my Dr Friend These are scenes never to return.

I shall by no means make use of any part of your correspondence without your express approbation and I should think that any of Your medical Ideas might be brought forward with the greatest propriety. Nothing else of course must appear, this would corroborate my Evidence before the Committee "that I was constantly in the habit of hearing All Your Medical Opinions."

Your Name would serve the sale of my Book and Modes etc etc shall rest entirely with Yourself. Worgan's Letters being of course wholly Literary I hold myself at Liberty to make use of and some of Fosbrookes with his preobtained leave.

I think I have drawn up your character in a high and finished style. I have condensed all the Eloquence I was master of in it. You will pronounce it superior to all which the Journalists of Europe have produced—but who is better qualified upon the score of real knowledge to pourtray the Character of *Edward* Jenner, than *Edward Gardner.*

Sunday noon

Have just seen Mr. Hicks. The Small Pox was brought into Frampton by a Boy from Gloster Markett.

Dr. Jenner
Physician
at
Cheltenham

[The letter carries the postmark Stroud, and "Mr. Bartley" is written at side.]

It is fitting that a short note should be added regarding Edward Gardner himself to whom we are indebted for glimpses of the personalities mentioned, all too briefly, in the pages of his manuscript. He was born on 2 September 1756, and was, he says, a natural child, his father being a considerable wine-merchant in Bristol; he knew very little of his mother who is said to have been very handsome. At an early age he attended the seminary of the Rev. Collinson which was held in a chapel formerly annexed to Redclift Church in Bristol. Thence he went to the Free Grammar School to which had just been appointed the Rev. Charles Lee, M.A., of Eton Foundation and Fellow of King's College, a tutor of whom Gardner wrote with gratitude and affection. Here his favourite companion and bedfellow was Robert Lovell Gwatkin who later married Miss Palmer, a niece of Sir Joshua Reynolds, who left him ten thousand pounds.

In 1774 the Gardner household moved to Frampton but "some years previous" Gardner had become acquainted with Chatterton when they were both members of a Bristol literary circle which assembled at an obscure public-house in the town; at that time Chatterton was a clerk articled to Mr. Lambert, an attorney in Corn Street, Bristol. Gardner was introduced to the circle by William Edwards, the basket-maker poet, as a boy who "understood Latin." "I shall never forget," writes Gardner, "with what avidity Chatterton rushed forward and seizing my hand exclaimed, 'My young man do you really understand Latin?' 'Perfectly, Sir.' 'Where were you taught?' I said, 'At the City Grammar School under Mr. Lee.' 'I wish I had had that good fortune,' said Chatterton, 'Suffer me to visit you and do for me what you can.' "

Gardner continues:

> After this first interview he visited me very frequently but his residence in Bristol was short, yet so great was his aptitude of intellect joined with an ardent desire for literary acquirements that in less than two months I pushed him through the syntax of the Latin grammar. I never understood that he got further forwards after he arrived in London. Hard-pressing penury, and heart-rending care prevented one of the fairest buds of Genius from blossoming. His mind was continually employed in providing for the day that was passing over him; but Pride, high-soul'd Pride, perhaps in too many instances inseparable from the literary character, and that frequent concomitant of Genius prompted this unfortunate Youth to arrest the progress of earthly woe by the rashness of suicide before he had reached his eighteenth Year.

I had some Idea of introducing some memorials of the Celebrated Controversy concerning the disputed Poems of Rowley. It need not be mentioned to the learned World that they are now univirsaly ascribed to Chatterton and regarded as his forgeries. During even my short acquaintance with him I had many opportunities of knowing more concerning the secret Arcana of this business than most other People. Perhaps at some future day I may give my full sentiments to the World.

Gardner senior wished his son to go to a university preparatory to entering the ministry but was dissuaded by Mr. Lee who had no prospect of a preferment for the young man, who was then eighteen years old. He had long been an omnivorous reader but without guidance until he received a letter—which is copied in the Memoirs—from Mr. Owen Cambridge, author of the *Scribleriad,* who advised the pursuance of a reading plan and indicated the best classical authors. While living in Bristol, Gardner received a few lessons in Italian from Signor Sastres who was the intimate friend of Dr. Johnson and who, says Gardner, "was the only witness to the last breath which that Stupendous Genius ever drew, at the Moment when the immortal spark was quitting its tenement of Clay he grasped the hand of Mr. Sastres and exclaimed 'Jam moriturus.' "

Gardner's meeting with Jenner took place on Frampton Green in 1780. Gardner says that he had heard so much of Dr. Jenner that he was anxious to see him. He found him dressed in a blue coat with yellow buttons, buckskins, well-polished jockey boots with handsome silver spurs, and carrying a smart whip with a silver handle. His hair, after the fashion of the times, was done up in a club, and he wore a broad-brimmed hat. The acquaintance thus begun soon ripened into a cordial friendship, which lasted for more than forty years. During the whole of that time he enjoyed Jenner's confidence and was entrusted with all his most secret and private affairs. It was to Gardner that Jenner first confided his views regarding inoculation against smallpox. He opened his heart to his new-found friend while they were riding on the road between Gloucester and Bristol, near Newport. He went over the natural history of cowpox, specified the different kinds of disease which attacked the milkers when they handled infected cows, dwelt upon that variety which afforded protection against smallpox, and with deep emotion mentioned his hope of being able to propagate that variety from one human being to another, till he had disseminated the practice all over the globe, to the total extinction of the smallpox. The talk was concluded by Jenner in words to the following effect: "Gardner, I have entrusted a most important matter to you which I firmly believe will prove of essential benefit to the human race. I know you, and should not wish what I have stated to be brought into conversation; for should anything

untoward turn up in my experiments I should be made, particularly by my medical brethren, the subject of ridicule—for I am the mark they all shoot at."

This conversation proved to be a momentous one for it enabled Gardner to declare before the Committee of the House of Commons "that Dr. Jenner, in the month of March 1780, had informed him of the nature of the cow-pox and communicated at the same time his design of perpetuating that affection from one human being to another."

It will be seen that Jenner was clear as to his method of attack even at this early date and in November 1789 he inoculated his eldest son, Edward, then about 1½ years old, with swinepox matter and various attempts were made during the next three years to produce smallpox in the child by the insertion of variolous matter but without success. Several more years elapsed before he felt justified in making the first experiment outside his own family. In a letter, again to Gardner, dated 19 July 1796 describing the inoculation of the boy Phipps, he wrote: "But now listen to the most delightful part of my story. The boy has since been inoculated with the smallpox which, as I ventured to predict, produced no effect. I shall now pursue my experiments with redoubled ardour."

It was to Gardner that Jenner turned when troubled more than usual by criticisms of his work. In a letter dated 7 March 1799 he wrote: "Dear Gardner, There never was a period in my existence when my situation called so loudly for the assistance of my literary friends as the present. Though my bark will, with flying colours, reach the shore at last, yet it is now in a storm. I am beset on all sides with snarling fellows, and so ignorant withal that they know no more of the disease they write about than the animals which generate it. . . . Give me as much of your company as you can, and as speedily. Yours, very faithfully. E. Jenner.

On another occasion: "I am jaded almost to death, my dear Gardner, by constant fatigue; that of the body I must endure; but how long I shall be able to bear that of the mind, I know not, Still the same dead weight bears upon my heart." This depression may have been connected with Jenner's disappointment some years before in the lady of his affections. It is hoped that Gardner's reply held more consolation than that of Hunter who wrote: "Let her go, never mind her. I shall employ you with hedge-hogs." He was to wait till they were torpid and then, "I could wish you would make a hole in one of their bellies and put the thermometer down into the pelvis, and see the height of the mercury."

To Jenner's embarrassment Gardner wished to "send some memoir into the world in praise of inoculation and its discoverer" and in a letter to

James Moore dated 23 July 1813 Jenner says: "But I have been constantly entreating him to desist, conceiving, that independently of the vaccine discovery, there was nothing of sufficient interest to engage the attention of the public. Believing that I have succeeded, I think he would have no reluctance in furnishing you with his scraps if you thought it worth while to apply to him. You need not mention this intelligence as coming from me. His name is Edward Gardner, and his residence is Frampton near Stroud, Gloucestershire."

Gardner's first publication was a poem on war which appeared in the *Monthly Miscellany* of 1774 and he continued to write verses for the literary magazines for twenty years. "Retaliation" and "Liberty" were published in 1776, the latter being a poem of six hundred lines dedicated to the Hon. George Berkeley. In 1796 he issued a small treatise of about forty pages; at this time a great scarcity of corn made farmers and corn-dealers unpopular and this tract was intended to stem the tide of opinion against them. His chief work is entitled *Miscellanies in Prose and Verse; Original Poems of T. Chatterton* (Bristol, 1798, 2 volumes). Assistance in revision was given by the Rev. T. D. Fosbroke of Horsley, who included some of Gardner's poems in his *History of Gloucestershire.*

His unpublished "Memoir" is, in the main, an assessment and comparison of writers and poets. After Shakespeare, "superior to criticism," his favourite was William Collins whose "every line is a diamond of the first water."

Nor must it be forgotten that Dr. Baron in his *Life of Jenner* wrote: "For almost all his early letters I am indebted to his friend the late Edward Gardner of Frampton-upon-Severn, who bequeathed them to me on his death-bed."

I include a list of names, both great and humble, which are mentioned in Gardner's Memoirs. A name, especially when linked with a locality, is often of great interest to the genealogist, and forgotten manuscripts have proved to be particularly rich in this kind of buried treasure. Thus it is the duty of anyone who possesses a collection of "worthless" writings to submit them before destruction to his local librarian who will gladly arrange for their examination by one of the societies which specialise in the preservation of valuable documents. Many notable discoveries came to light in this way during the wartime salvage drives and doubtless many more would have been made if the urge to "get rid of this rubbish" had been checked and a more deliberate policy pursued.

Page 2. Rev. Mr. Collinson; in 1762 kept a seminary in a chapel formerly annexed to Redclift Church in Bristol.

P. 3. Rev. Mr. Sayer, Head Master of the Free Grammar School at Bristol. Rev. Charles Lee, M.A., of Eton Foundation and Fellow of King's College.

P. 4. Robert Lovell Gwatkin, Gardner's bedfellow; afterwards married Miss Palmer, niece of Sir Joshua Reynolds.

Pp. 9, 20. Rev. Owen Cambridge, author of the *Scribleriad*.

P. 11. Chatterton. Mr. Lambert, an attorney in Corn Street, Bristol, to whom Chatterton was an articled clerk.

P. 12. William Edwards, basket-maker and poet "not inferior to Chatterton." He entered the Navy about 1779, accompanied Admiral Hughes to the East Indies, and died there soon afterwards. His sonnet to Sabrina (River Severn) was published in the second volume of Dodsley's *Miscellanies*.

Chatterton's clubmates were Edwards; James Thistlewaite, bookbinder's apprentice; Lockstone, a journeyman linen-draper in Wine Street, Bristol; Smith, afterwards a strolling player; Murphy, a barber; Casey, an accountant in Mr. Cruger's house, Bristol; and Gardner.

P. 14. Nathaniel Clifford of Frampton Green. The ancient family of the Cliffords had lived there since the Norman Conquest. The romantic "Fair Rosamund" was born there and a deed existed at Frampton Court House which bears her name as a witness.

P. 15. Rayner Jones, Esq., of Hay-Hill House.

P. 16. Mr. F. B. Thomas of Arlington—"a worthier man never lived." Lord Berkeley.

P. 17. The Yates family. Sir Richard and Lady Mill. Hon. C. Fox.

P. 18. Earl of Leicester. Said to have built a great house called "The Wick" at Barrow Hill.

P. 19. Duke of Buckingham, under whose patronage the first glasshouse in England was erected at Newnham.

P. 20. Nathaniel Cambridge, a Turkish merchant, Lord of the manor of Saul, near Frampton. Married Miss Trenchard of Dorset; their son, the Rev. Owen Cambridge, was author of the *"Scribleriad."*

P. 22. Dr. Craddock, rector of Slimbridge, tutor to Addison. Messrs. Sheppard and Hicks, cloth manufacturers of Eastington. Wm. Fryer, Esq., of Eastington.

P. 23. The Cliffords of Tretherne Lodge. Samuel White Esq., of Tretherne Lodge. Edmund Burke.

P. 27. Mr. Sastres, Italian tutor, of Bristol. He is mentioned by Boswell (5 April 1776) as one of the men with whom Johnson kept company. A bequest in Johnson's will is "to Mr. Sastres, the Italian master, the sum of five pounds, to be laid out in books of piety for his own use." Sastres published several books, some original poems, and *A general Account concerning the Literature, Fine Arts, useful Discoveries, etc. of all Italy*, a monthly magazine with the Italian and English in parallel columns. Mrs. Piozzi (Letters 2, p. 383) and Fanny Burney (Diary 2, p. 333) testify to Sastres' affection for Johnson.

P. 36. Mr. Price, of Herefordshire, author of "The Picturesque."

Names in Gardner's Letter to Jenner: Dr. Baron; H. Jenner; Mr. Fry of Dursely; Earle; Mr. Clifford; Mrs. Edward Davis; Mrs. Cambridge; Fosbrooke; Mr. Hicks; Mr. Bartley.

Acknowledgment

I am indebted to Mr. W. R. LeFanu, Librarian of the Royal College of Surgeons of England, for permission to make extracts from the "Memoirs" as required. Also to the Editor of *Notes and Queries* who kindly provided a very full note on Mr. Sastres, the Italian master.

James Currie and Hydrotherapy

C. B. COSBY*

IN the long procession of writers on hydrotherapy from Savonarola and Paracelsus through Sir John Floyer, James Currie, Rush, Brand, and Winternitz to Simon Baruch, the father of modern hydrotherapy, Currie seems the first to practise the scientific approach. While the works of Baruch have been widely disseminated in several languages and have merited their acclaim in focusing the attention of our times on this field,[1] less than proper tribute has been given the pioneer work of James Currie. Currie has been incorrectly styled "the Dr. James Currie of Virginia."[2] While he lived as a youth here in Virginia, the major portion of his life was spent in Liverpool and he is more properly designated as "the Dr. James Currie of Liverpool." It was this contradiction and confusion of the hydrotherapist with his Richmond cousin of the same name that led to a further scrutiny of the circumstances of his life.

Local interest in the Doctors Currie could be expected since "Dr. James Currie of Richmond" had his home and dispensary only a city block from The Medical College of Virginia (opposite the present City Hall), and the younger cousin of hydrotherapy fame no doubt resided there for a short time. The elder Richmond relative (1745–1807) had emigrated from Scotland where he had studied medicine in Edinburgh, beginning practice here about 1769 or 1770. He was thrifty and collected his fees strictly after the manner of his people. He was on terms of friendship with Jefferson, who wrote him in 1786 from Paris and sent him the "simple and sublime" designs for the Virginia State Capitol. In 1779 it is recorded he received a fee for examining a convict in Virginia. He was buried in St. John's Churchyard in 1807.[3]

It is clear that there were several contemporary James Curries.[4,5] The hydrotherapist "of Liverpool" died in 1805. The date of publication of his "Reports," 1797, and the facts of his recorded research place him in hospital practice[6] in Liverpool at least five years previously. The Virginia relation

* Richmond, Virginia.

[1] Baruch, S. *Principles and practice of hydrotherapy*, 1898.

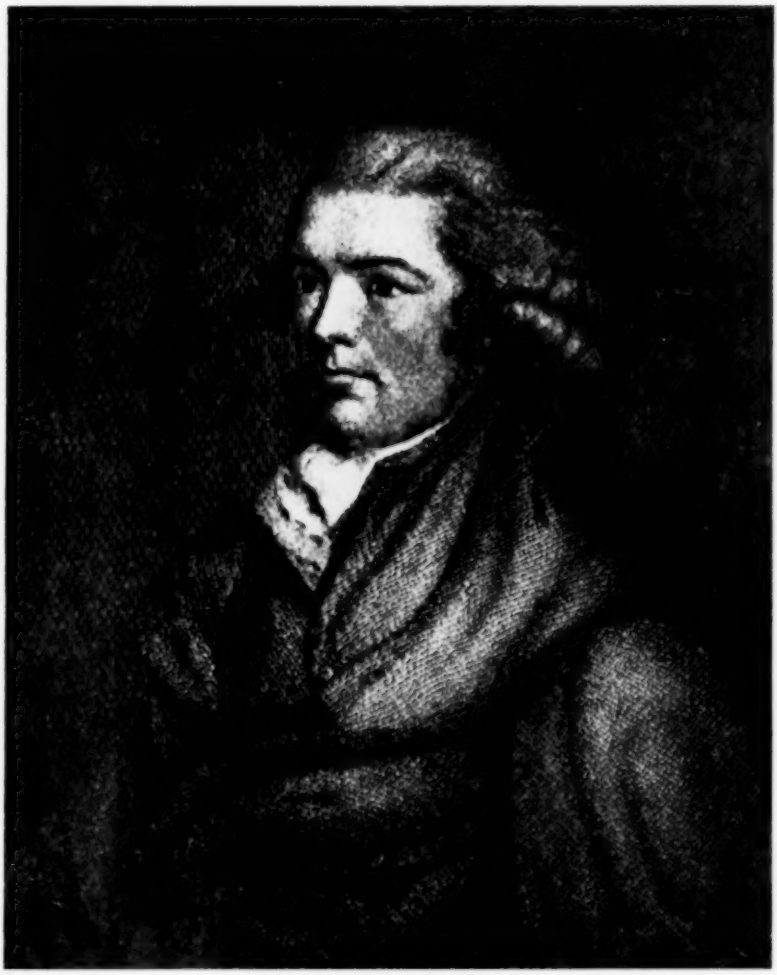
[2] Wyman, J. F. In: *Medical physics*, ed. by Otto Glasser, p. 619.

[3] Blanton, W. B., *Medicine in Virginia in the eighteenth century*. There is some confusion as to the Virginia Currie's dates and marriages.

[4] The nephew of the Virginia Currie was also James Currie, whose education the Liverpool Currie supervised. He settled in Kentucky on the borders of Ohio (W. W. Currie, *Memoir of James Currie*).

[5] Another Dr. James Currie, of London, 1763–1819, was known as "Calomel Currie" (Comrie, *History of Scottish medicine*, p. 719).

[6] Currie, James, *Medical reports* (Philadelphia, 1808 ed.).



James Currie 1756–1805
(From Garrison's *History of Medicine*)

is reported to have visited England only once, about 1772. Correspondence between the two has been published.[7]

His life, as given by his son, was full of tragedy, adventure, and sickness.[8] His grandfather and father were ministers of the Scottish Church in Annandale, Scotland, "3 miles from Gretna; so well known in the history of runaway marriages." His father, educated in Glasgow, in the later years of his life was poor but held in high esteem as the intellectual leader of the community. James Currie was born May 31, 1756 and lost his mother at thirteen years from consumption, and subsequently four sisters died of the same disease. His father thought him too sentimental to be a great success. During his mother's last days he was sent away to school, and was on the point of delivering a commencement address when informed of her death. His father being ill at the time, the son was the chief mourner at the funeral. A returning relative told tales of soldiering in America and much impressed the youngster, who immediately aspired to a life of military glory and adventure, and the flock of geese at home soon felt the repressions of his soldier-boy campaigns.

The straitened conditions of the family finances and the promise of one of his father's pupils, then in the trade with Virginia, to make the youngster's fortune, resulted in his taking service in the friend's mercantile firm and journeying to work at Cabin Point, a small settlement on the James River in Virginia in 1771. This early experience in Virginia, coupled with his easily aroused sympathies, is the apparent keynote to understanding his later life. He had early to learn mature judgment and independence. An intermittent fever in Virginia was almost fatal and was a precurser to the recurrent fevers which plagued his entire life. His interest in fever cure certainly had a personal foundation. His employment (apparently as a merchant's apprentice) was uncongenial and the place swampy and unhealthful. Two years after his arrival in Virginia his father died, leaving the family without support. While he wished to support his sisters in England, he had to continue two and a half years longer in his contracted service. His diligence at work made his prospects of giving material help to the other children bright. Unfortunately the storm of the American Revolution which was heard from Boston through the Carolinas swept all personal matters aside. He wrote after the Boston Tea Party that the trade with the mother country, in which his fortunes were placed, declined, and stores were broken up on all sides by the Virginians in their anger at the English. The boycott was so effective and the lot of the loyal Scots made so miser-

[7] Currie, W. W., *ibid.*

[8] Currie, W. W., *ibid.*

able that many gave up and returned to England. Even though a mere youth, Currie wrote in Pinkney's Gazette[9] that, though he was undecided as to the merits of the case of the colonists, the loyal Scots merited fair treatment. His fortunes were with the mother country, and he resented the roughness of his own treatment, but nevertheless he saw the fault of the arbitrariness of the Governor of the Colony, and the poor wisdom of the mother country in using force against the colonists. On May 23, 1775, he wrote home predicting that the colonists "being bred up to the gun from infancy . . . as fine marksmen as any in the universe," with the advantage of "the woods, excellently fitted for ambuscades . . . could never be conquered." In September of that year, he wrote again entreating, ". . . the sword will never do. The flame of liberty blazes in a high degree in this colony."

In doubt as to the wisdom of returning to England, he sought the advice of his relation, Dr. James Currie of Richmond. He decided thereupon to forsake the life of a merchant and return to Edinburgh to study medicine as his father had originally intended, and ultimately to practise in Virginia.

He then made an arrangement to act as contractor and passenger for a ship to the West Indies. Although the Convention of the colony had granted permission to sail, their ship was seized by an armed vessel on the third day out, by orders of General Lee and the Convention, with no reason given. Currie was delegated by the group of young men to wait upon the Convention to ascertain the reason for the arbitrary seizure. He wrote out a stinging protest for presentation by a seemingly friendly Convention member, but withdrew it when he found it was to be reworded in such a way as to bring reproach to his motives. After his return to his shipmates, they were deprived of their belongings and set loose in the forests.

After his return to Cabin Point, he was drafted into the Revolutionary Army to go to New York but was allowed to furnish a substitute at the cost of ten pounds. Since his sympathies were known to lie with the mother country, he and his like were deemed fair game and he was again drafted. This time he made an excursion to North Carolina to arrange and load another ship with barrel staves for Martinique for a friend of Lord Dunmore, but a ban being placed on the export of staves by the new Congress, the vessel was reloaded with a new cargo, only to be stopped at the mouth of the Albemarle Sound by orders of the North Carolina Convention. Currie this time went in an open boat 150 miles to Edenton to protest. The

[9] Better known as *Virginia Gazette* [*Williamsburg*]. Quoted in W. W. Currie, *Memoir of James Currie*, pp. 25–26.

excessive heat blistered his face and hands completely and, while awaiting the verdict of the Convention, he was seized with a violent fever. The Convention charged that the cargo had been reported not as declared, but was specie, and that this would have to be verified by inspection during unloading and reloading, with the posting of a bond to assure delivery in the West Indies. Currie's bond was refused and it was only after a Convention member, ashamed at the treatment given, guaranteed the bond, that he and the ship were allowed to depart. He finally arrived in Eustatia, disposed of the ship and cargo with further difficulties, engaged for a while in business with a London firm in Antigua, had another siege with fever and recovered to find his money lost in the business failure of the firm.

Because of his losses in this connection, he had to accept a political mission to England in order to get home. His fee of a hundred pounds was contingent upon success, and, as a result of delay due to misadventures and near shipwreck twice en route, he was deprived of his promised pay.

At twenty-one he entered the University of Edinburgh to study medicine, but a serious seizure of rheumatic fever had to be endured while studying. Here he read to the Medical Society two papers on the effect of cold on the body, pointing it out as both a cause and cure in disease. His industry attracted the favorable attention of the famous Dr. Cullen. He became a member of the Physical Society.

On a vacation to visit a friend who had lost a daughter in the full bloom of maidenhood, his sentimentality burst forth in an "Elegy," the first stanza of which goes as follows:

> To this lone spot my devious footsteps led,
> Here on the turf my careless limbs repose;
> The rude rock hangs stupendous o'er my head,
> And at my feet the winding Annan flows.

During his medical career he was a member of that long tradition of doctors who were also scholars and literary lights. Later he corresponded with Sir Walter Scott, Erasmus Darwin, and Robert Pitt, knew Robert Burns and Edmund Burke, and led a literary circle in Liverpool.

He sought a medical appointment in an army expedition to Jamaica. His graduation time from Edinburgh coinciding with the departure date of the expedition, he received his diploma instead at Glasgow more conveniently in April, 1780.[10] While awaiting the appointment, he made a visit to the country and venturing into an abandoned church graveyard was startled by a half-naked female maniac fleeing from a burial vault.

Through lack of proper political backing he failed to receive the ap-

[10] Comrie, *ibid.*, p. 268.

pointment on the expedition, but engaged passage nevertheless to Jamaica, intending to proceed from there to join his Virginia cousin in practice. At the last moment illness and the entreaty of friends prevented his sailing to Virginia. It is just by this much that he missed being the James Currie of Virginia. Another of the clan of Doctors Currie, "of Chester," advised him that Liverpool presented a real opportunity for practice and he settled there in 1780. During the smallpox epidemic of 1781, he actively advocated inoculation.

He seems to have sponsored progressive and humane causes, even under adverse criticism. In 1787, his advocacy of the abolition of the slave trade, so intimately connected with the business exchanges of Liverpool, made him unpopular among a powerful local group. With Mr. Roscoe of the House of Commons he wrote the sentimental ditty, "The African," which was set to music as a propaganda tool for this cause. In 1789 he advocated the establishment of a proper lunatic asylum for Liverpool. In 1790, Currie and Roscoe issued a series of essays entitled "The Recluse" in the *Liverpool Weekly Herald*. In 1792 he worded resolutions in behalf of trade with India, and the same year was chosen a Fellow of the Royal College of Physicians, Edinburgh. In June, 1793, he wrote the political pamphlet, "Letter from Jasper Wilson to Mr. Pitt." Other activities of a civic nature included advocacy of fever wards, of humane treatment of French prisoners, and of improvement of the living conditions of the poor. It is understandable that his home became the resort of liberal men of learning and celebrity. About this time he lost an infant son.

He was the first biographer of Robert Burns and editor of his collected works.[11] That a scientific physician, exponent of public welfare, should also have an additional facet in this direction seems unbelievable. It all happened in this manner: Currie had found a mutual interest in the oppressed and the lowly in the writings of his fellow Scot, Burns. He had met Burns once and, in considerable admiration, he followed the poet's work through his former college mate, Syme, who was a close friend and neighbor of Burns. He noted the announcement of Burns' death with dismay and wrote Syme for an account of the circumstances, especially as to the verification of rumors that the untimely death was due to drunkenness. Syme then narrated that the widow and children were unprovided for and that he had tried in vain to get the publishers in Scotland to bring out an edition of Burns' works so that the poet's family would be given financial aid from the proceeds of its sale. Currie suggested that a sympathetic biographer be appointed at once, so as to prevent further distortion by a stranger

[11] Currie, James, *The posthumous works of Robert Burns.*

of the circumstances of the poet's life. Syme and Gilbert Burns, the poet's brother, visited Currie to acquaint him with the true life of Burns, and Currie, reluctantly and with humility, undertook the biography in order to relieve the financial stress of the widow. The subsequent publication was very popular, though serious students after Currie's death contended he glossed over the tawdry facts too much and exaggerated the favorable with rather maudlin sympathy. Nevertheless, it is *the* biography of Burns and it earned him the bouquet, "The laurels which encircle the grave of Burns wave over the never fading flowers planted by the kindred hand of Currie." This kinship, like that with James Currie of Richmond, seems remote as far as can be checked, unless, as it seems, all Scots are bound by ties of close blood.

In 1804, in poor health, he made a pilgrimage to Dumfries, to the home of Burns, and to his native Annandale only a few miles away. One other literary production has to be recorded, his 1805 ode, "Address to Sleep—Composed at Intervals of Disturbed Rest." Realizing his death was approaching, he sought ease and respite in the south of England in Sidmouth where he died in patient, religious submission. Some of his parting advice was, "Never give wine in cases of mental distress, for that men frequently fly to it as a temporary relief, contract the habit, lose their ideas of virtue and are ruined." He lived forty-nine years and had six children. Besides the death of the infant son previously noted, two sons died early, one a midshipman, the other a clergyman. It can be assumed that another of the children was his biographer, William Wallace Currie.

James Currie was considerably influenced by Dr. William Wright who is credited with introducing in 1779 the Scotch douche.[12, 13] He read the report of Dr. Wright, later President of the College of Physicians, Edinburgh, published in 1786, on his experience in Jamaica and at sea with treatment of fevers by sea-water affusions. It seems that Dr. Wright himself caught the fever while attending a fatal case in the ship's company and noted that in the cold air on deck his symptoms abated though every other expedient had failed. This encouraged him to try cold-water showers. He had three buckets of sea water thrown upon him with just a cloak loosely thrown around his stripped body. A repetition at evening when the febrile symptoms returned gave him an appetite and a good night's rest. Four other such baths saw him to full recovery, and the same treatment was used successfully on a passenger.

While Sir John Floyer (1649–1734), the friend of Samuel Johnson,

[12] Coulter, *Physical therapy*, credits this to Dr. William Cullen (pp. 60-61).

[13] Garrison, F. H., *An introduction to the history of medicine*, p. 818.

prescribed water affusions for reducing fever after consideration of pulse time, Currie would allow the prescribing of this therapy only after actual measurement of temperature by thermometer, and study of pulse time, regularity, and strength. The familiar physicians' bedside implements of the pulse-timing watch and the thermometer were introduced to the medical profession by these two workers in hydrotherapy, Floyer and Currie respectively.[14, 15]

Currie resolved, on reading Dr. Wright's account, to try it at the first opportunity. In the 1787 Liverpool epidemic he tried it first on nine cases with success.[16] After this he accumulated a register of one hundred and fifty-three cases, at which point he began to record and study only failures of the treatment so as to discover the precautions necessary in its prescription. A mass trial was then given to the treatment when a breakout of the fever occurred in the 30th Regiment. Besides giving the treatment to the segregated serious cases, he began an inspection of the men in the ranks, withdrawing and giving immediate treatment to those displaying early symptoms; he also ordered a cleansing of the barracks and burning of all the old furniture. The uninfected were marched down daily for a plunge in the sea. In one month the epidemic (thought to be typhus) was arrested. Of 58 cases, two were fatalities, 32 cases went through the regular course of the fever, "and in 26, the disease seemed cut short by the cold affusion." The two fatalities were seen by Currie only after the 12th and 14th day of the disease, after they had been bled by other physicians, and were known to be of a weak constitution. The Mersey River water used, Currie carefully checked to be 58° to 60° F. and of $\frac{1}{32}$ part salt. He thought salt water better for this purpose than fresh as it had a stimulating effect on the vessels of the skin.

Hydrotherapy in fevers he considered contraindicated when any sense of chilliness, as during the chill phase of fever, or when general or profuse perspiration was present, or when the pulse was feeble, or when thermometer readings were lower than or just normal. He thought that cold affusions immediately after exercise and on the beginning of perspiration were harmless, while after long continued sweating and rest were dangerous. His thermometer was curved, so that the physician could avoid danger of contagion from the patient's breathing. He also introduced to the profession the maximum reading mercury thermometer with the iron float marker. Also, incidentally, he showed that in some cases of insanity forcible

[14] Coulter, J. S., *ibid.*

[15] Guthrie, D. *A history of medicine,* pp. 257–258.

[16] Probably one of the rickettsial fevers, identified by Currie as typhus or "jail fever" in accordance with Cullen's classification (Currie's *Reports,* p. 27, Philadelphia ed., 1808).

bathing had a remarkable effect. Several patients so treated were returned to normal life from the asylum.

In 1792, in his paper before the Royal Society, he explained the death of several of the strongest men of a ship's crew who had been cast upon a submerged sand bar in December at the mouth of the Mersey River. Those of the ship's crew who were nearly entirely immersed survived, while others who were intermittently immersed and exposed to the wind died. Several experiments on the effects of wind and wetting led him to an understanding of the effects of forced draft, and to undertake studies of the real function of perspiration. The work of Rousseau on the absorption by the skin of aromatic materials, especially of turpentine, along with his own work, convinced Currie that respiration of the skin, i.e., of respiration gases, was very limited and the main function of the skin was, instead, transpiration of water for the purpose of regulation of body heat by evaporation.

Although Franklin had previously speculated in this direction and Lavoisier and Seguin had submitted this for publication in 1790, as a consequence of the French Revolution it was not actually published until 1797 and was until 1801 unknown to Currie, who had published meanwhile. In a controversy with a Dr. Jackson who claimed priority in fever cure by water, Currie pointed out that he laid claim only to a specific manner of hydrotherapy for this purpose and referred to a Dr. Cockburn's publication in the early 1700's of the accidental fever cures of a woman passenger and some seamen who jumped overboard in delirium and were rescued.

In 1801 he cured his two sons, three and five years of age, of serious cases of scarlatina. He poured four gallons of water at 64° F. over his children about twelve or fourteen times in 32 hours. In three days both were evidently safe.[17] After this he had uniform success with this therapy in 50 out of 52 cases of scarlatina. Others, in misapplication of his method on two patients "in low delirium, with the skin cool and moist, and pulse scarcely perceptible," poured very cold water madly over the patients, with immediate fatalities.

While in 1804 he recorded much success by others with his method, he was perturbed that in the Philadelphia fevers of 1793–94, Benjamin Rush, who never applied affusions to their full effect, abandoned them in the second epidemic of 1794. Rush ascribed the poor results in 1794 as compared to those in 1793 to abandoning bloodletting. Currie to the last fought bloodletting as unnecessarily debilitating regardless of the "refrigeration" it caused.

He remarked about the American results that he knew of not a single

[17] Currie, James. *Medical reports.*

thermometrical observation in fever in all America at that time. Drs. Selden and Whitehead published in 1802 a trial of Currie's method with uniform success in Norfolk, Virginia.[18] Currie argued that contrary to the manner of treatment prescribed by Rush, baths if they are to be beneficial should begin in the first three days of fever and not be delayed till a crisis is imminent.

In warming a patient, Currie found the efficacious method to be application of heat to the abdomen. After short immersions in cool baths he noted reflex warming. His experiments opened before him the fruitful vistas of research into metabolism and temperature control. He said, "The capacity of the animal to preserve its heat nearly unchanged in the various changes of the temperature of the surrounding media is essential to, may indeed be said to constitute life."

Regretting his ill health would not allow him to explore the possibilities that await the experimenter in temperature, respiration, metabolism, and the effect of disease, drugs, and food thereon, he deplored the tragedy that a Bacon was not at hand to undertake it, and that Lavoisier, who had hoped to, had been executed. Later, when this field of research was resumed, the mood to apply it to hydrotherapy was lost, and it is only recently that the scientific research and the will to apply the results in hydrotherapy were to be found together.

REFERENCES

BARUCH, S. *Principles and practice of hydrotherapy.* New York, W. Wood & Co., 1898.

BLANTON, W. B. *Medicine in Virginia in the eighteenth century.* Richmond, Garrett and Massie, 1931.

COMRIE, J. D. *History of Scottish medicine.* London, Bailliere, Tindall & Cox, 1932. (Vol. 2)

COULTER, J. S. *Physical therapy.* New York, Paul B. Hoeber, Inc. (Clio Medica series), 1932.

CURRIE, J. *Medical reports on the effects of water, cold and warm, as a remedy in fever and febrile diseases.* Philadelphia, 1808. 2 vols. (1st ed., Liverpool, 1797)

———*The posthumous works of Robert Burns, with an account of his life and a criticism on his writings.* Liverpool, 1800.

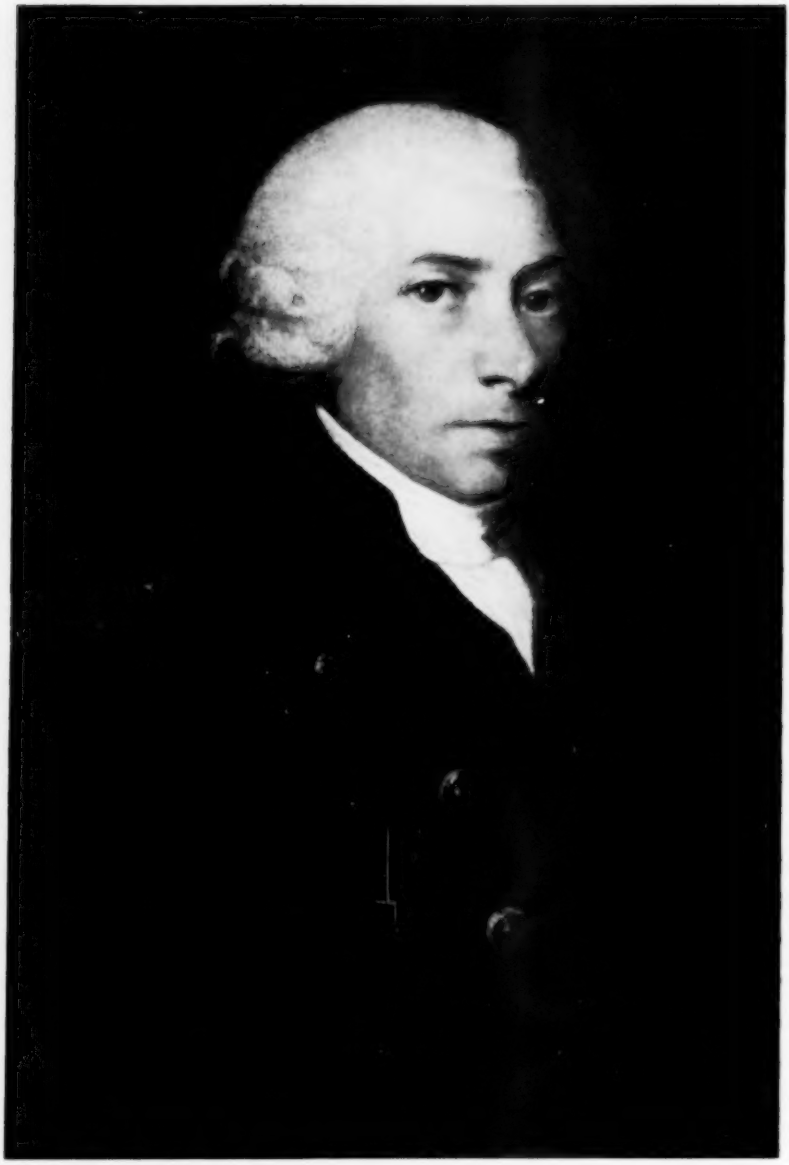
CURRIE, W. W. *Memoir of the life, writings and correspondence of James Currie, M.D., F.R.S. of Liverpool.* London, 1831. 2 vols.

GARRISON, F.H. *An introduction to the history of medicine.* Philadelphia, W. B. Saunders Co., 1917. 2d ed.

GUTHRIE, D. *A history of medicine.* Philadelphia, J. B. Lippincott, Co., 1946.

WYMAN, J. F. In: *Medical physics,* ed. by Otto Glasser. Chicago, Year Book Publishers, 1944.

[18] James Currie, *ibid.*



Michael Underwood, M.D., 1736–1820
(Attributed to John Zoffany)
Reproduced by kind permission of the owner,
J. E. Schatcherd, Esq., Chislehurst

Michael Underwood: A Surgeon Practising Midwifery from 1764 to 1784

W. J. MALONEY*

FROM 1784 down to the middle of the nineteenth century, at least twenty-five editions of Underwood's *Treatise* taught diseases of children to Europe and America. That fabulous *Treatise* is still piously recalled, by some as the source of the earliest description of poliomyelitis, by others as the origin of the modern art of pediatrics. But even among those who remember, its author remains, as he has always been, little more than a name.

Who he was and where he came from, no one seems to know. The *Dictionary of National Biography* repeats a statement, first made by Munk, that Underwood was born in the English county of Surrey; 1715 is given as the year of birth by Baas, August Hirsch, Déchambre, Bayle and Thillaye, as well as others; 1736, not only by the *D.N.B.*, but also by the *Dictionary of Universal Biography;* and 1737, by the editor of Underwood's diary. In 1795 he died, according to Baas, Hirsch, Déchambre, and others; in 1820, according to English writers.

These authorities were evidently discussing not one Underwood, but two: an earlier, whose career ran between 1715 and 1795; a later, who lived from 1736–7 to 1820. Only the second is recognised by the English.

Baas, without comment, cites merely the dates, 1715–1795. Hirsch gives an accurate German version, duly accredited, of the sketch by Déchambre, who wrote: "Underwood (Michael) chirurgien de la Maternité de Londres, médecin de la Princesse de Galles, naquit en 1715 et mourut le 10 décembre, 1795. Il s'était fait une grande réputation par son ouvrage sur les maladies des enfants: Treatise on the Diseases of Children, London, 1784." This account by Déchambre (1886) can be traced back to Dézeimeris (1839), in the same words, and without authentication.

The Register of the Company of Surgeons in London contains no Michael Underwood of the period, 1715–1795. No surgeon called Underwood is listed in Young's Annals of the Barber Surgeons. The death of such a surgeon is not recorded by Musgrave in his list of obituaries prior to 1800. Yet, a venerable surgeon named Underwood did die in London on the 10th of December, 1795, and the death is thus reported in *The Sun* (Thursday, December 17, 1795, p. 4, col. 4): "On Thursday

* New York City.

last, in the eightieth year of his age, Mr Underwood, surgeon and apothecary, of Blackman-street, in the Borough." This notice also occurs in *The Gentleman's Magazine* (1795, *78,* 1059), and in *The European Magazine* (1795, *28,* 431). All three obituaries styled him "Mr." and nothing more. The Mr. in France became M. and led to the belief that Michael had died. The will of this Blackman Street surgeon, probated the very day of his death, and still preserved at Somerset House, London, shows his baptismal name was not Michael but William.

Michael Underwood who wrote the famous Treatise was a Licentiate in Midwifery of the Royal College of Physicians in London. Hence, Munk's *Roll* of that College is the standard English source of reference on Underwood. In the preface to the first edition of the *Roll,* Munk states (1861, I, vi): "Having destroyed in 1857 most of the memoranda upon which my sketches were founded, I find myself now unable to trace many of them to their respective sources." Assiduously he made new memoranda, and the material he then assembled is now in the College Library. Examined at the direction of the present Keeper of the Library, Dr. J. Joyce Keevil, this material did not disclose the origin of Munk's information about Underwood's birth. However, Munk also says in his preface that he has "been greatly indebted" to "that invaluable repertory of biographic lore, *The Gentleman's Magazine.*" An obituary in it (1820, *90,* 286) reads: "March 14 . . . At Knightsbridge, aged 84, Michael Underwood, M.D. . . ." The *Roll* states: "Michael Underwood . . . died at Knightsbridge, March 14, 1820, aged 84. . . ."

Munk is the only cited source of the *D.N.B.* sketch. Norman Moore, who wrote it, may have arrived at the date he gives for Underwood's birth by counting back eighty-four years from 1820.

Among the death notices in *The Times,* March 22, 1820, one announces (p. 3, col. 5): "On the 14th inst., at his residence, Knightsbridge, in his 83rd year, Michael Underwood, M.D., Licentiate in Midwifery of the Royal College of Physicians in London, and late Senior Physician to the British Lying-in Hospital. He had the honour of bringing into the world Her Royal Highness, the late much-lamented Princess Charlotte of Saxe-Coburg. His loss is severely felt by his friends, as well as by the neighbouring poor, to whom for many years he gave his advice gratis."

His will, "proved at London 3rd May 1820," bears the official notation: "The Testator Michael Underwood was late of Queen's Buildings,

Knightsbridge, in the parish of Saint Mary Abbots, Kensington, in the County of Middlesex—Doctor of Physic and died the fourteenth of March last."

The will, "written on five Pages of Paper by my own Hand," disposed of "Navy five per cent Stock," a "painted portrait of His Royal Highness the Prince Regent" (later George IV), some books, a few trinkets, including two silver snuff boxes, and the household effects at Queen's Buildings. All the books were either religious or medical. Among the other contents of his home were a silver watch, a repeating-watch, a stop-watch, "the Time-piece usually standing on the Dining-room Chimney-piece . . . a high Time-piece on a marble pedestal . . . and the largest Time-piece in a Mahogany-case." At the probate, the executors swore the estate did "not amount in value to the Sum of Four Hundred and Fifty pounds."

Remembered in the will were his children and a niece, Anna, who acted as his housekeeper; Anna's only sister, Maria, together with her two brothers, Samuel and James Underwood; the testator's "good friend," Mr. William Summers, of Brook Green, Hammersmith, as well as his "kind friend, Thomas Chevalier of South Audley Street, Surgeon" who with A. Chevalier and J. Cornwell witnessed the document.

After directing that "my vile body be, with as little expence as with decency may be done, committed to the grave, in my vault in the late Revd. Mr Whitefield's Chapel, in Tottenham Court Road, by the side of my late dear wife and children," the will instructed the executors "to pay the sum of five guineas, of good and lawful money of Great Britain, to the poor widows who shall at that time be inhabiting the almshouses of the yard of the chapel . . . to be equally divided between them . . . as a small remembrance of God's great mercies to me, in, and through, that despised place."

Having assured the remains a respectful reception, the will left "my stop-watch with gold chain and seal with my coat of arms, crest, and cypher, my gold shirt-buttons, and the choice of my silver snuff-boxes" to "my dear elder son, Caesar."

Among its other clauses was: "Item, to my dear son, John Underwood, surgeon, now in the East Indies, I bequeath Clark's family Bible, Scott's Essays, and Mason's Morning and Evening Treasuries, in the hope he may be induced frequently to read therein; also all my medical books and ms. medical papers and prescriptions, and all my surgical

instruments and apparatus; also my ms. addition of two books to Milton's Paradise Regained."

Besides these additional books of Milton's *Paradise Regained,* Underwood had written a diary of 122 volumes, which he devised in the following paragraph: "Item, I bequeath to my dear daughter, Sarah Cockburn, my interleaved Bayly's Bible, Booth's Reign of Grace, Mr Romaine's Posthumous Letters, Dr Hawker's Poor Man's Portion, Robinson's Scripture Characters, and all my ms. diaries and Journals."

Caesar, Sarah, John, and Anna were the principal beneficiaries. Anna's share included "my small yellow leather case long made use of as my pocket-purse, with such money as may be found therein at the time of my decease." Caesar and Sarah each received about £100, and in addition, "any and all sums of money due to me by my son Caesar Underwood, as also by my said daughter, Mrs. Sarah Cockburn, or by her husband, Mr Thomas Cockburn," were discharged and forgiven.

With his £100, Caesar set up as a watchmaker, at 9 Ranelagh Street, Pimlico, but the venture expired with the year. Once before he had been in business for himself, having opened a watchmaker's shop at 3 Panton Street, Haymarket, in 1798, only to have to close it in 1800. Still earlier, he had been a member of the firm which announced in *The London Gazette* (1795, p. 384): "The partnership carried on in the Name and Firm of Mess. Robbins and Underwood, Watch and Clockmakers, of New Lisle Street, Leicester Square, was dissolved by mutual consent, on the 22nd day of April, 1795. Witness our hands. John Robbins. Caesar Underwood."

The only Thomas Cockburn in contemporary London directories was a coal merchant, who had lost his listing when the will was written. Had Underwood outlived Cockburn, a codicil might have made further provision for Sarah. The date of Cockburn's death has not been ascertained; but it must have been earlier than October, 1823, for *The Christian Observer* announced that month the appearance of "Extracts from the Diary of the late Michael Underwood, M.D., consisting of Meditations, Critical and Practical Remarks on Various Passages of Scripture, Miscellaneous Essays and Occasional Hymns. Published for the Benefit of his Widowed Daughter."

This was a paper-covered duodecimo volume of 170 pages, published by subscription and offered for sale through fashionable booksellers at seven shillings a copy. Preceding the text was a list of 195 persons who had subscribed in all for 300 copies. The list opened with "His Most

Gracious Majesty,[1] 15 copies." After him came "H.R.H. Prince Leopold of Saxe Coburg, 6 copies." The other subscribers followed in alphabetical order. Among them were: "Mr P. Cockburn, Whiteng, Ayton, Scotland, 3 copies" —perhaps some connection of the Thomas Cockburn whose widow, Sarah Underwood, was the beneficiary of the publication; and "Mr C. Underwood, Ranelagh Street, Pimlico, 1 copy" — evidently Sarah's brother, Caesar,[2] the unstable watchmaker.

Three others of her name, "Dr Underwood, Gloucester Place; Mr M. Underwood, Queen Street, Brompton; and Mr Underwood, Oxford Street," rallied to her support, each subscribing for one copy. Of these, only Mr. William Underwood, woolen draper, Oxford Street, is listed in the London Post Office Directory for 1823. If, as seems likely, Sarah was related to all three, she would be a second, or more distant, cousin of theirs.

Though the diary had been left to Sarah, she probably had little to say about the traffic in it, for the Prospectus of the *Extracts* says: "She is in her fiftieth year, and borne down by an accumulation of troubles, arising partly from the loss of relatives and friends, and partly from serious mental debility, which frequently incapacitates her for the humble and precarious employment of needlework, in which she is at other times engaged."

The selection of the extracts was "undertaken by a friend of the family," who said of his task:

> It was the constant practice of the deceased to commit to paper the occurrences of each day, for his own personal gratification; thus every minute domestic circumstance, as well as every professional visit, was regularly noticed; but his grand object appears to have been that of recording his own religious impressions and Christian experiences. These various topics were inserted in the diary, without any regard to order or arrangement. . . . The diary extends to 122 volumes and embraces a period of more than sixty years.
>
> Respect for the literary reputation of the deceased precluded all idea of garbled extracts, which could only convey an imperfect idea of his style, and the whole, being too voluminous, might possibly involve names, and circumstances of private interest, with which the public have no concern.
>
> In this dilemma, the editor, in pursuit of his object, was so fortunate as to meet with some miscellaneous papers interspersed through the Diary, which appeared admirably adapted to his purpose, and he must appeal to those friends of the deceased who perused many of the articles during the lifetime of the author, for a justification

[1] George IV. Underwood had presided at the birth of his only legitimate child, Princess Charlotte Augusta, 7 January 1796. She became the wife of Prince Leopold of Saxe Coburg, and died in child bed 6 November 1817.

[2] Caesar Underwood is not listed in the accessible London directories between 1800 and 1820. He appears in 1800 and again in 1820, but not afterwards.

of his conduct, in omitting the details to which he has referred, and substituting what he considers the best written, as well as the most valuable portions of the manuscripts; because they exhibit the amiable writer in the character of an able defender of the faith in which he had the happiness to live. . . .

Introducing his selection, this "friend of the family" remarks:

Dr Underwood was born September 29, 1737, and received the first rudiments of his education in West Moulsey, whence he was removed to Kensington, and afterwards placed under the professional instruction of Sir Caesar Hawkins, by whom he was introduced at St. George's Hospital as a house pupil for several years, and ultimately established himself as a Surgeon, in St. Margaret Street, Cavendish Square. Having changed his line of practice, and evinced great skill as a Physician Accoucheur, he gradually rose to prominence in that department, and was so fortunate as to enjoy the friendship of the late Dr Warren[3] who, shortly after the marriage[4] of the Prince of Wales (now George IV), kindly introduced him to Carlton House, on which he received the high appointment of Physician to the Princess of Wales, and in January, 1796, had the honour of presiding as Accoucheur at the birth of the late lamented Princess Charlotte.

Having been thus brought conspicuously into notice, his practice rapidly increased, and the road to wealth was opened to him with all its allurements.

While thus basking in the sunshine of prosperity, an accumulation of domestic afflictions excited a high degree of nervous irritation which, acting on a frame naturally weak, produced a dreadful depression of spirits; he imagined himself incapable of discharging the arduous duties of his profession; and in the year 1801 resolved to withdraw himself from all further practice, and pass the remainder of his days in entire seclusion from society.

During the latter portion of his earthly pilgrimage, he experienced the liberality of his Christian friends, to whom he was partly indebted for that moderate competency which he enjoyed to the close of his eventful life; and it is due to those kind friends to state, that their liberality was most gratefully acknowledged, and frequently recorded in his diary. The Doctor retained the exercise of his faculties to the last moment.

The Extracts were published by Hatchard and Son, Piccadilly. This publishing house was acquired, almost sixty years ago, by the father of Mr. E. W. Shepherd who has since been active in its direction. He could not find in the firm's records any word of the original diary or of its editor.

The editor shared Underwood's religious views. His authority in the diarist's family, his charitable enterprise on behalf of the sick, widowed daughter, the exclusively religious character of the diary extracts he deemed "most valuable," and his appeal for justification "to those friends of the deceased who perused many of the articles during the lifetime of

[3] Richard Warren (1731–1797), M.D., Physician to St. George's Hospital 1760–1766, Physician in Ordinary to the King, 1763.

[4] April 8, 1795.

the author" all suggest he was an influential and well-known dissenter, probably a minister, and possibly the Rev. William Summers, Brook Green, Hammersmith, who was named by Underwood sole executor, but who declined to serve.

West Moulsey, where Underwood first went to school, is in Surrey, on the outskirts of London, a few miles beyond Hampton Court Palace. When Underwood was a boy, it was a hamlet of some two hundred people, a center for several small estates, with a church, St. Peter's, to which the school was annexed. Now that hamlet has become a community of ten thousand, has a modern school, and is usually called West Molsey. Of the ancient church, only the Norman tower remains. From the parish register, the present Vicar of St. Peter's, the Reverend W. A. J. Yeend, has kindly extracted the following: "Henry, son of Mr. John Underwood and Dorothy his wife, baptiz'd October 10th, 1736 . . . was bury'd December 17th, 1736. Michael, son of Mr. John Underwood and Dorothy his wife, was born September 29th, 1737, and baptiz'd October 9th, 1737." Two other sons are registered as born in the parish to John Underwood and his wife: namely, James, 12 September 1738, and Hatch, 14 April 1744.

Besides the day of his birth and the story of his first school, the writer, in a diary of such length in which there was noted every minute domestic circumstance, must have made many a reference to his parents. Since the editor suppressed all such references, he may have feared these might discourage snobs from loyally following their King in subscribing for the diary. There are said to be six Underwood families that display the bearings of gentlemen. To one of these six probably belonged the coat of arms which Michael Underwood bequeathed to his son Caesar. The Chester Herald of the London College of Arms reports that no coat of arms was registered by Michael Underwood, and that the College archives contain no trace of his particular family.

The parish register makes no mention of the trade his father followed. From West Moulsey, some time after 1744, the family moved to London. There the name was neither rare nor common. It was well known in the Worshipful Company of Clockmakers. Britten, the chronicler of that craft, lists along with other clockmakers named Underwood: "John, 36 Noble Street, Cheapside, 1754–75; John and Sons, Foster Lane, 1758–63; Robert, 3 Falcon Street, 1769–1810; Caesar, 3 Panton Street, 1798–1800, and 9 Ranelagh Street, Pimlico, 1820." Baillie also notes a John Underwood who was apprenticed in 1751. Among these old clockmakers may or may not be the father and brothers of Michael, but unless Michael came of a clock-

making family, he would not likely have apprenticed his elder son, Caesar, to that trade.

As a London clockmaker, John, the father of Michael, Underwood is little more than a shadow. Actually, he was a substantial citizen. Underwood's will mentions "a large chest upon chest of my honoured Father's." The provision made by this honoured father for his other sons is not known. Michael was apprenticed at the age of sixteen to London's leading surgeon, Caesar Hawkins (1711–1796). Hawkins had served John Ranby, who is said by Wall to have charged a premium of two hundred guineas. It probably cost no less to indenture Michael Underwood. As principal Serjeant Surgeon, Ranby had attended George II at the battle of Dettingen. Two years later this King granted through Ranby the charter of The Company of Surgeons in London.[5]

The Register of that Company records that Michael Underwood was apprenticed on June 6, 1754. The Register infrequently shows either the term of the apprenticeship or the premium paid. Underwood was the second apprentice registered by Hawkins after the incorporation of the Company in 1745. Neither entry records the term or the fee. These details Hawkins evidently considered were the concern not of the Company, but of his pupil and himself.

When Underwood was indentured, Caesar Hawkins was Serjeant Surgeon to George II. This high and ancient office required Hawkins to attend the King in time of peace on any surgical occasion; in time of war on the battlefield; and on the death of the King to embalm the royal corpse. Among the privileges of the office was dominance in the Company of Surgeons. Ranby was its first Master. Hawkins was Master from 1748 to 1749. Since 1747 he had served both on its governing court—the Court of Assistants—and on its Court of Examiners; and since 1735, he also had been a surgeon at St. George's Hospital.[6]

In his book, *St. George's,* Blomfield says: "From 1736, one of the surgeons' pupils constantly resided in the house." In 1745, "the resident staff of the hospital consisted . . . of the apothecary and one surgeon's apprentice. Neither of these was medically qualified. . . . The poor-box sum was supplemented, by order of the Board, by the fees paid for his board." Hawkins introduced Underwood to the Hospital, probably as his resident apprentice, but according to the editor of the diary, as a

[5] Its history has been written by Mr. Cecil Wall. In 1800 the Company was reorganised as The Royal College of Surgeons of England.

[6] Hawkins' first apprentice, John Gunning, also became both a surgeon at St. George's and a Serjeant Surgeon.

house pupil. In 1949, the Hospital could find no record of Underwood among its house pupils.

The editor of his diary affirms that Underwood was "at St. George's Hospital as a house pupil for several years." Underwood himself writes of his "long residence" there. It commenced not later than 1758. In the typescript album of the alumni of St. George's Hospital since 1752, which was compiled by the well-known ophthalmic surgeon, Mr. R. Rutson James, and is now in the Library of the Royal College of Surgeons, Underwood appears as the hospital house surgeon on June 24, 1761, seven years after he had been indentured. The house surgeon's term was one year.

Between June 24, 1762, and October 4, 1764, there is at present no note of Underwood's activities. During these fifteen months he may have walked the hospitals and attended anatomy lectures at Paris.[7] On October 4, 1764, having paid a fee of six guineas and contributed the usual half guinea to the poor-box, Underwood received the Grand Diploma of the Company of Surgeons and was registered as a member. The same year, at the age of twenty-seven, he began practice in Margaret Street, Cavendish Square, about ten minutes' walk from Mr. Whitefield's Chapel in Tottenham Court Road and about the same distance from the British Lying-in Hospital, Brownlow Street, Longacre.

Until the eighteenth century, attendance at childbirth was an office sacred to the midwife, who was licensed by ecclesiastical authority. This office passed from her, much as the midwifery forceps ceased to be a Chamberlen family secret and came to be considered indispensable to the practice of obstetrics. Armed with these forceps, eager young surgeons rushed into the new specialty which in 1749 first[8] acquired the dignity of a London establishment of its own with the founding of The British Lying-in Hospital. Underwood hastened there when he started practice. And as it was a very proper institution, he may have had to stop on the way to take a wife.

The new hospital was for married women only. An expectant mother seeking admission was required to "make an affidavit of her Marriage and Place of Settlement." No mother left the Hospital unchurched, and no child unbaptised or unregistered. At the Weekly Board meeting preceding her departure, the mother had to present herself, there to voice any complaint, to express her gratitude, and to obtain a 'Paper' for the vicar to sign "the first Time she goes to Church, to return God Thanks for her safe Delivery." After this Paper had been signed and brought

[7] Preface to the tract *On Ulcers* (1783).

[8] The Rotunda Hospital, Dublin, opened in 1745.

back to the Hospital, the mother was in good standing, should she again chance to require the services of the institution.

One of its regulations read: "As many more patients apply every week for Admission than the Income of the Charity can at present support, the Gentlemen of the Faculty take each Patient's Reckoning, which they subscribe at the Bottom of the Recommendatory Letter, and agreeable to the respective Times of Reckoning, each Patient ballots for the Preference of Admission: those drawing white Balls receive immediate Orders of Admission; those drawing red Balls ballot again the next Board Day"—if still expectant!

"Laws, Orders, and Regulations of the British Lying-in Hospital for the Reception of Lying-in Married Women" were made, amended, and published from time to time. The 1757, 1767, 1771, and 1781 editions[9] are among those still accessible. The Hospital also issued an annual report of the work accomplished and the money received and expended. This "Account of the British Lying-in Hospital" consisted of a single large printed sheet, folded twice to make eight pages. The copies that survive have usually been bound together with the latest issue of the "Laws" in a thin, multicolored, contemporary cardboard cover.

The "Account" listed the contributors with their addresses. A yearly contribution of three guineas made the donor an annual governor, entitled not only to issue one Recommendatory Letter a year, but also to elect and be elected to the Hospital Board. As a three-guinea governor, Mr. Michael Underwood, Surgeon, St. Margaret's Street, Cavendish Square, appears in "An Account of the British Lying-in Hospital . . . to June 24th, 1767." When this "Account" was published, Underwood's association with the Hospital was over two years old. The minutes[10] report his presence as a member of the Weekly Board early in 1765.

The Hospital moved obedient to law. One law ordained: "That there be two Consulting Physicians. That there be two Physicians-in-Ordinary practising Midwifery. That there be two Surgeons practising Midwifery. And no more at the same Time." A vacancy having occurred, a minute, dated July 24, 1765, records: "Mr William Graves and Mr Michael Underwood, the two candidates for the office of one of the surgeons to this hospital practising Midwifery, vacant by the death of Mr John Torr, being

[9] 1767 and 1771, published by C. Say, Bookseller, Newgate Street; 1781, by E. Cox, Great Queen Street, London.

[10] For access to these minutes, I am indebted to Miss Joan Wild, the gracious and able Secretary of the British Hospital for Mothers and Babies, Samuel Street, Woolwich.

present, and Mr Underwood desiring to stand the ballot, Mr Graves was declared duly elected."

Despite this rebuff, Underwood continued to woo the hospital. According to the minutes, "Dr. Garthshore and Mr Underwood visited the House and reported all well" to the weekly Board meeting, November 22, 1765. Such attention helped to win him a place on the staff. The minutes of October 29, 1766 record: "Mr Michael Underwood, being the only candidate to succeed Dr Bromfield as Surgeon, was unanimously elected as Surgeon to this Hospital practising Midwifery, in his place."

At that time the presence of men at childbirth was not yet common, and not always welcome. As late as 1772,[11] "the reigning crime of adultery" was attributed to "the shameless custom of employing men-midwives." Men-midwives was the official designation of the early obstetricians. In 1766, the year Underwood began to specialize, the St. James' Register or Royal Annual Kalendar listed Dr. Samuel Wathen as "Man-midwife in Ordinary to the Queen"; and Dr. Moses Griffith as "Man-midwife Extraordinary." The *D.N.B.* describes Underwood as a man-midwife.

Having been elected one of the surgeons practising midwifery, Underwood religiously fulfilled his hospital duties. Routine deliveries were conducted by the Matron, assisted by the nurses and the pupil midwives. To protracted and difficult cases, the physicians and surgeons were summoned in rotation. Besides the obstetrical work, Underwood attended to the surgical complaints of the recent mothers and newly born infants. He also lectured to the six highly recommended, married, or widowed pupils over twenty-five years of age whom the hospital, for a fee, trained as midwives. And, in addition, the minutes show, he busied himself with the administration and welfare of the institution.

By 1758 he had started his diary. At the end of each day, Underwood the apprentice-surgeon, rendered to Underwood, the Calvinistic Methodist, an account of how it was spent. Absorbed in his work at St. George's, he may have thought zeal a virtue, and the approval won from Serjeant Hawkins and Dr. Richard Warren the due reward of the righteous. But when he retired to commune with his diary at night, he had less pleasing illusions. In fact, he feared at times he had lost sight of his Guide. The earliest dated extract selected by the editor was written, perhaps in Paris, on October 6, 1762, four months after he had ceased to be a house surgeon, and was entitled, "Am I following God?"

[11] The Universal Catalogue. Item 736. London. J. Bell, Exeter Change, in the Strand.

As an adherent of George Whitefield (1714–1770), Underwood was given to searching his soul in the manner of the dissenting saints. Of what he found there, scarcely anything has yet been disclosed. But one diary entry, dated 1764, charges him with belittling others as a means of exalting himself. "How often have thy lips," he wrote, "broke the law of kindness; how oft spoken evil of thy neighbour both true and not true, and from prejudice, and wanting to make your own story good, more ashamed of being thought wrong thyself than that thy neighbour should greatly suffer; and all of these, when conscience has been pleading against them. Oh! is not this evil!" (p. 14).

With admission to membership in the Company of Surgeons began his struggle for an independent existence. This involved an adjustment of moral principles to worldly practice, an adjustment which fretted Underwood into writing: "Thou wouldst be something, suffer who will."

Even in the pursuit of success, he stopped at times to meditate. The seven "Meditations" published in the Extracts belong to the years between 1764 and 1774. "I was often cautioned," the diary records (p. 165), "against reasoning on the deep things of God, but I frequently had such powerful suggestions darted into my mind, that I seemed unavoidably, as well as often insensibly, led to seek some suitable reply."

Apparently in a state of agitated depression, on June 26, 1771, Underwood wrote to Whitefield's[12] crusading disciple, the Reverend William Romaine (1714–1795), who was then in charge of the combined parishes of St. Anne's, Blackfriars, and St. Andrews of the Wardrobe ("Extracts," p. 87):

> Dear Sir, I would not intrude on your time but that I earnestly long to open my case to you, if God allow me to be at Blackfriars, on Wednesday next, and that I cannot so well explain myself to you, unless you first have some general knowledge of my singular and distressing case. I cannot see how it is that man deserves hell for his actual transgressions, because my mind is hurried on to consider the moral necessity of sin, from the variety of temptation and afflictions he is under. . . . Oh! Sir, could I see the guilt of sin, methinks I see virtue enough in the blood of Christ for pardon; I behold in him a perfect obedience, and I consider God as satisfied with it, could I but justify him, were he to damn me; but the want of this keeps me back, and I dare not believe; though if misery would drive me, I am of all men the most miserable at times; yea, I have told the Lord in prayer that it seemed to me that I could go to hell contentedly almost, could I but justify him there, and see that my actual sins deserved that place of torment. I seem of all men to be excluded the grace of the gospel, and cut out for despair. . . . Oh! Sir, if I deserve nothing else from you, if you can give me no comfort, I claim your pity. I am most miserable. . . .

[12] Whitefield had gone to America in 1763 where he died at Newburyport, Massachusetts, in 1770.

I do see sin in all that I do. . . . Do pray for me. If you could feel the horror I endure at times, I am sure you would. When I am ill, and under any nearer view of death, my distress is inexpressible. . . .

The cause of this attack is not known. The suffering, though real, may have been less than the dramatic letter would imply, for it did not interrupt his work to any considerable extent. The hospital minutes show his unwonted absence from the weekly Board meeting on May 3rd, 24th, and 27th, but no irregularity in his attendance during June and July, 1771.

How long this agitation lasted only the diary could now disclose. Fifteen months later (November 22, 1772), he was still writing about his depression, not in a private letter to his spiritual adviser, but in a Cowperish poem entitled "The Sovereignty of God." It contains thirteen stanzas, of which two run:

> Burthen'd with cares, oppress'd with pain,
> Proud nature up in arms again,
> My soul is rous'd, it looks abroad,
> And strives to meditate on God;
> Confused, it wanders far, and fain would trace
> The vast abyss of its Creator's ways. . . .
>
> Lost in this search I oft have sat
> And murmur'd at my hapless fate,
> Athirst this wisdom to attain,
> In darkness bound to grope in vain;
> Now, help'd awhile, I wisdom's steps explore,
> Now, sink more dark and wretched than before.

Underwood was then thirty-five years old. While writing religious meditations and verses, he had become not merely a surgeon practising midwifery, but also a husband and father. About 1764, when wooing the British Lying-in Hospital, he took a wife, as has been mentioned, to whom he gave as a token "a screw farthing piece, containing within, a small piece of gold." Her name is no longer known. The place of the ceremony has not been ascertained. There is no record of the wedding either at St. Anne's, Blackfriars,[13] or in the London parish registers put out by the Harleian Society. It may have been solemnized at Mr. Whitefield's Chapel, in Tottenham Court Road, which a German rocket bombed into rubble on March 25, 1945. "Whatever old records existed," writes a church official, "were in the strong room in the basement, which was very thoroughly destroyed, with its contents."

His wife was still living in 1788, for Underwood, while lauding the

[13] Though this church was destroyed by a German incendiary bomb, its records were saved, and are now in the Guildhall Library.

efficacy of a conium preparation called cicuta,[14] wrote (*Surgical Tracts,* 1788, p. 38):

> Of this the author of these pages was perhaps, one of the most fortunate instances, when under the care of Dr. Warren for a most severe and painful affection of the face. The cicuta also proved equally successful in regard to Mrs. Underwood, when affected for a long time with violent pain in the stomach, and for which Dr. Warren had previously directed cordials, bitters and opium, without any lasting advantage. The author hopes he shall not offend that eminent practitioner by taking this opportunity of publicly acknowledging the very great obligations he has long been under to his friendship and services; and as by no means the least of these, that he has been more than once the kind instrument of prolonging the days of his nearest relative and comfort in life.

Since Caesar, Sarah, and John survived him, and since he was buried at the side of his "dear Wife and Children," at least five were born of the marriage. Two are mentioned, one a girl, the other a boy, in the first edition of Underwood's *Treatise on Diseases of Children.* While praising oil of amber, Underwood writes (1784, p. 132): "In a little child of my own, it immediately gave a turn to the complaint in the most violent hooping cough I ever met with, and after almost every other medicine had been tried to no purpose; so that from the hour she took it, the complaint was no longer alarming or tedious to cure." And later (1784, p. 139), he affirms that early medication can cut short croup, "as I once saw in a little boy[15] of my own, who was nearly cured in two days."

After an apprenticeship of seven years, Caesar Underwood, the eighteenth century watchmaker, served two years as a journeyman. Having acquired the art of watchmaking he probably spent an additional year or two in learning the business. He could not have been less than twenty-five when the firm of Robbins and Underwood was formed, and as it lasted over a year, he was about twenty-six when it dissolved in April 1795. Hence, he was born not later than 1769. Sarah, being "in her fiftieth year" when the diary was published in 1823, was born sometime after October 1773. John's birth took place in 1774. At the age of thirty he became a member of the Royal College of Surgeons of England, which in 1800 had succeeded the famous old Company of Surgeons. He owed his membership to the fact that he was an assistant surgeon in the East India Company, which he had joined in 1803. He rose to be a member

[14] Regarding cicuta, he had earlier written (*Treatise on the diseases of children,* 1784, p. 133): "I have known many people depend solely upon it in very bad cases, to the exclusion of other remedies evidently indicated, and the no small detriment of the patients."

[15] The register of the Society of Apothecaries of London records the following apprenticeship: "Aug. 3, 1784. Michl. Underwood to Richard Walker, St. James Street."

of the executive medical board, retired in 1839, and died,[16] of "congestion of the liver,"[17] at the age of sixty-five. Caesar and Sarah may have predeceased him, for no mention of either is made in John's will.[18]

Underwood's children, down to Caesar, were born at 29 Margaret Street; Sarah and John at 10 Holles Street.

The parish poor rate books show that in 1770 Underwood removed to Holles Street where he stayed till 28 April 1780, and then went to live at Great Marlborough Street (off Regent Street), in a house unnumbered. In 1764, his rent was thirty pounds a year; in 1784, forty-five pounds, four shillings and ten pence.

Judging by the rent, he made a comfortable living as a surgeon practising midwifery. Apart from the missing diary, where "every professional visit was regularly noticed," Underwood's writings contain few references to his practice. As he sometimes brought a case to Sir Caesar (*Treatise,* 1784, pp. 207 and 210; *Surgical Tracts,* 1788, p. 39), no doubt he sometimes received one from his master; but when Hawkins retired, his clientele turned not to Underwood, but mainly to Sir Percivall Pott.[19]

As a surgeon, Underwood successfully incised an imperforate anus (1784, p. 205); probably operated on hare-lip (1784, p. 201); and "treated" hypospadias as well as lesser congenital faults. Though he was nervous, and apparently chary of operating, his skill was sufficient to maintain with credit for many years his surgical association with the British Lying-in Hospital. Even if it did not bring him a lucrative practice in infant surgery, that association made him expert in midwifery, an art which later enabled him to bask "in the sunshine of prosperity." Yet when he first turned to writing for publication, he chose as his theme neither midwifery nor the surgery of the newly born, but ulcers.

In 1783, he issued a tract entitled, *A Treatise upon Ulcers of the Legs; in which Former Methods of Treatment are candidly examined and compared with one more Rational and Safe: Proving That a Perfect Cure may generally be effected more certainly, without Rest and Confinement than by the Strict Regimen in Common Use; with an Introduction on the Process of Ulceration and the Origin of Pus Laudabile. To Which are*

[16] "On the 30th ult., at the residence of his daughter, Mrs Ormsby, No 6 Oriel Place, Cheltenham, John Underwood, Esq., late a member of the medical board at Madras, in the East Indies. Most deeply and sincerely regretted." *"The Times* (London), Tuesday, December 3, 1839.

[17] Certified copy of the death certificate in the New York Academy of Medicine.

[18] Original at Somerset House, London, England. It contains no reference either to the additional books of Milton's *Paradise Regained* he inherited, or to his father's 122-volume diary.

[19] "He [Pott] moved in 1777 to Prince Street, Hanover Square, when the retirement of Sir Caesar Hawkins materially increased his practice." (*D.N.B.*)

added Hints on a successful Method of Treating some Scrophulous Tumours; and the Mammary Abscess, and Sore Nipples of Lying-in Women. All this cost only three shillings and was issued by J. Mathews, No. 18 Strand, of whom the eighteenth century literary bookseller, John Nichols, writes: "James Mathews, a very respectable Bookseller and Vender of Medicines . . . was also a Lay-preacher in a chapel of his own at Whetstone; and father of Mr. Charles Mathews[20] of Drury Lane Theatre."

In the preface to this tract, the author admits that what he "has to say in point of directions might have been expressed in a smaller compass, or have appeared in some periodical publication, but . . ." it was spread over ninety-eight pages. Since he intended a book, to these were added forty-one pages of preface and introduction, and, for good measure, nine pages on scrofulous tumours and ten on inflammation of the breast. "With regard to the few hints on scrophulous affections, and complaints of the breast in lying-in women," the author remarked, "how far they are worthy of the attention of the public is cheerfully submitted to their consideration."

For scrofulous tumours Underwood recommended poulticing till an abscess formed, came to a head, and burst; the resulting cavity or sinus he packed with red precipitate ointment. He also poulticed, and did not incise, inflamed breasts and mammary abscesses. To shield the nipple, he used a "large nutmeg, hollowed out, and the edges left flat." And on sore cracks he applied a mild astringent lotion of green vitriol which, "being perfectly harmless," did not require to be wiped off before laying the child to the breast.

The excuse for the book was the essay on ulcers. For writing on them, his reasons were:

> His education under the best of masters, together with his long residence in one of the largest and best conducted hospitals of this metropolis, as well as his attendance at those of Paris, gave him sufficient opportunities of seeing that for some cause or other the knowledge of completely healing old ulcers in the legs has been and still remains deficient and uncertain. The subject, though of so great importance to the suffering individual, has perhaps not appeared of sufficient importance to eminent surgeons, whose employment has usually been both of a more profitable and agreeable kind. . . . The writer of the following sheets, without affecting any uncommon share of philanthropy, would not willingly have risked the favourable opinion of his friends, had he not been persuaded that the practice he has ventured to recommend is founded on the most rational principles, and will not fail to be of some service to the distressed. . . . And if any improvement can be suggested in a branch of sur-

[20] In his memoirs Charles says he was born in the bookshop, which issued only religious works. He lists a number of them, all dissenting tracts. Charles' name is among the subscribers to the Extracts from the Diary of the late Michael Underwood.

gery professedly imperfect . . . no great apology can be thought necessary for communicating to the world any hints on the subject that may be thought useful.

In short, Underwood was fulfilling a duty, as his profession required and his conscience demanded.

His conscience remaining suspicious, the author in a last effort at self-justification wrote (p. 158): "It is his satisfaction to have aimed at things which it can be no crime to have attempted though his design should not perfectly succeed; whilst to have concealed what was judged likely to be of such public utility would have been criminal in the eye of every benevolent mind."

His association with St. George's had ended in 1762. Since 1766 he had been a surgeon practising midwifery at the British Lying-in Hospital, where ulcers must have been few. He states that he had been treating the ulcerous poor at his home. The diary may one day more fully reveal how he was led to aggressive dissent on the subject of sores and what finally determined him, in 1783, "to set aside the common remedies and applications for ulcers of the legs, and even to recommend a method diametrically opposite to that in vogue; as, exercise instead of rest and confinement; free generous diet instead of a sparing regime; and strong stimulant ointments rather than mild poultices and cooling cerates [p. 156]."

Man had limped on ulcerated legs since the dawn of time and had applied unguents and bandages to his sores in ancient Egypt. From the Middle Ages mercurial salves had been popular for ulcers, and in the eighteenth century the red precipitate ointment was lauded by Wiseman and Freke. William Rowley, a surgeon at St. John's Hospital, had published in 1770 (London, Newberry) *An Essay on the Cure of Ulcerated Legs, without Rest; exemplified by a Variety of Cases, in which Laborious Exercise was used during the cure;* and Joseph Else, a St. Thomas's surgeon, had learnedly discussed the same topic. Underwood mentions Wiseman, Freke, and Else repeatedly, and Rowley once, while putting forward this method of curing ulcers as hitherto unheard of. In fact, he alleges (p. ix) he had been "led to it long ago by an instance that fell in his way of a cure performed with great ease, and without confinement, by a very ignorant empiric, after two eminent surgeons had failed in the attempt."

Insinuating that eminent surgeons neglected the less profitable and agreeable employments, and rating their skill below that of an ignorant empiric while recommending a quack's cure, was unseemly in a franchised member of the Company of Surgeons, and also imprudent. Underwood

insured himself against disciplinary risks by inscribing the tract to the aged Hawkins who had been the Company's Master as well as his. Hawkins had resigned from St. George's in 1774, from his Court appointment in 1776, from the governing councils of the Surgeons' Company in 1777, and in retirement was delaying the end, when the tract "Upon Ulcers" was dedicated to him. Dated, "Great Marlborough Street, 19th April, 1783," the dedication read: "The following pages having been honoured by your approbation, allow me to inscribe them to you. . . . For though Sir Caesar Hawkins needs no panegyrist, the sanction of his name will make me less afraid of critical censure, either from the public at large, or the medical faculty in particular."

Booksellers then as now were at times publishers too. Rarely, a bookseller became an author, like John Nichols; less rarely, a magazine owner, like John Murray of *The English Review*. Each in his shop sold the others' publications which were listed, disparaged, or praised by anonymous pens in their respective catalogues or reviews. On its first appearance, a medical work could usually count on some sort of notice by one of these lay reviews, and occasionally by more than one. A salvo of publicity greeted Underwood's tract on ulcers. The notices were unusual not only in number, but also in friendliness and seemed, moreover, purposefully directed. Maybe they were inspired less by the merit of the tract than by the merchandising genius of James Mathews, the Calvinistic preacher, bookseller, publisher, and patent medicine vendor.

For the reader who would buy on a word from the wise, Henry Maty, Secretary of The Royal Society, wrote in *A New Review* (1783, *4*, 143): "This book, I am informed by professional men, is one of those few which removes boundaries of knowledge; it deserves therefore the strongest recommendation I can give it, and may be pointed out as proper to be had by all those who, at a distance from the best help, want to be enabled to judge of the help they have. Of an English book so circumstanced it does not come within my plan to say more."

To the reader who preferred a work of authority not much could be said in favor of a tract by the then unknown Underwood; but its sponsor[21] was lauded by *The English Review,* which stated (1783, *2*, 352): "This plain, sensible and well written pamphlet, let us observe by the way, is ad-

[21] The name of Sir Caesar was featured in the advertising. *The Public Advertiser* of 18 November 1783 (p. 4, col. 2) announced: "This day is published / Dedicated to Sir Caesar Hawkins Bart. / A Treatise upon Ulcers of the Legs / by Michael Underwood. . . ." Four months earlier, a notice inserted in the *Gazeteer and New Daily Advertiser* (12 July 1783, p. 3, col. 2) had read: "This day is published / price 3s in boards / Dedicated to Sir Caesar Hawkins Bart / A Treatise upon Ulcers of the Legs. . . ."

dressed to Sir Caesar Hawkins, a gentleman who practised for many years at the head of his profession, and who passed through the busy active part of life with more universal admiration, and more exempt from censure than men in general are apt to do." And after a digest of the pamphlet, this review went on to "recommend it as a very useful work to the practitioner of surgery."

The Critical Review presented its personal testimony. After an account of Underwood's treatment, in which the fact was stressed that he "does not permit walking but enjoins it," this review said first (1783, *56*, 156): "We are not willing to decide on the method recommended by our author," but announced later (1783, *56*, 4720): "We referred Mr Underwood's treatise to future experience. . . . We therefore take this opportunity to observe we have attended with care some trials of this method. . . . These experiments have in general been favorable to it." This critic may have actually seen, or even experienced, benefit from the treatment, for many leg ulcers were syphilitic, and Underwood's favorite salve was red precipitate ointment.

"He recommends," said the friendly but noncommittal abstract in the *London Journal of Medicine* (1783, 254), "the mer.corros.ruber, finely levigated. 'But for some of these purposes,' he adds, 'it must be used in great quantity, and instead of being lightly sprinkled over an ill-conditioned surface, the ulcer must be filled with it, the surgeon taking up a large pinch of it, and boldly plugging the sore. . . .' The liberal application of precipitate to ulcers is recommended by Wiseman. . . . If the sore does not soon change its complexion . . . we are advised to fill the ulcer with the precipitate, dissolved lunar caustic, or any similar escharotic, and when the slough is come out, to repeat it."

"The method of treating sores, which this writer recommends," said a belated but disapproving notice in *The Monthly Review* (1784, *70*, 139), "especially with regard to the liberal use of escharotics, is so contrary to what has been thought the improved practice in this age and country, that we doubt not it will be repugnant to the habits and feelings of many of our readers. . . . In the Writer's treatment of the mammary abscess, we find nothing which has not been mentioned in other late publications."

The eighteenth century authority on ulcers was Benjamin Bell, the Edinburgh surgeon, whose treatise, *The Theory and Practice of Ulcers*, published in 1778, went into a second edition in 1779. Underwood professed in 1783 to be "much indebted to the ingenious author of the Treatise upon Ulcers," which he cited over a dozen times, and in which he found

"the most profitable opinion advanced concerning the formation of pus" together with the definition of an ulcer he adopted, as well as the reasoning that "long ago perfectly satisfied him as to the safety and advantages of the tight bandage." Nevertheless, when Bell's third edition appeared in 1784, it contained the following comment (pp. 212–213):

> As confinement during the cure of ulcers on the legs, proves always inconvenient, various means have been proposed for rendering it unnecessary; and it has not only been said that cures may be performed without any assistance from confinement or a horizontal posture, but by some it is alleged that they are even prejudicial. . . . . This has been asserted by other writers; but it has been more fully enlarged upon of late, in a very ingenious Treatise upon ulcers of the legs by Mr. Underwood of London. . . . We have already remarked that ulcers of the legs may be healed while patients are daily going abroad, and especially if a due compression be continued. But, notwithstanding all of the arguments advanced in favour of the practice, I have not yet heard of any which ought to set aside the opinion we have endeavoured to inculcate upon this point, and which, indeed, has in all ages been allowed to be well founded; namely, that a horizontal posture is highly proper in the cure of every ulcer of the lower extremities.

Underwood's bid for the business in ulcers may at first have brought more beggars than baronets to Great Marlborough Street. Yet it might have proved lucrative, despite the inherent unsoundness of the treatment, had he persevered. His method had already won impressive endorsement in the lay press and had attracted the notice of Benjamin Bell. The campaign to promote it was progressing well when it was abruptly halted as the result of a grant to Underwood of the license of the Royal College of Physicians in London.

By virtue of a charter of Henry VIII, dated 1518, this College had jurisdiction over the practice of physic for profit in London and its neighborhood. Under the eye of the College Censors, surgery had been constrained to develop, as a manipulative and instrumental art, within circumscribed limits. According to Wall (p. 24), the barber-surgeons in 1664 agreed with the physicians to define surgery as "the treatment of tumours, fractures, dislocations, ulcers, wounds, syphilis, and female diseases." This definition had changed with the times, but ulcers had remained a preserve of the surgeon on which the ethical physician would not encroach. After April 5, 1784, when he became a Licentiate of the Physicians' College, Underwood perforce ceased to be a member of the Surgeons' Company. He thus lost his surgeon's franchise to treat ulcers for profit, for being a Licentiate of the Physicians' College he was not supposed to touch them.

As a rule, candidates for admission to this College were university graduates, usually alumni of the classical schools of Oxford and Cambridge,

and sometimes professionally qualified by additional training at Edinburgh, Leyden, or other great medical center. The Physicians' College shunned not merely surgery, but also pharmacy, midwifery, and trade. Its aversions were made statutory in 1771. The ordinance read (Wall, p. 154): "No one shall be admitted as a candidate who has practised as an apothecary or obstetrician or as a tradesman, and if any candidate, after admission, practise as an apothecary, or obstetrician, or tradesman, he is to be expelled."

Twelve years later, owing perhaps to the rapid development of maternity hospitals in London, this Olympian attitude towards the obstetrician was cautiously relaxed a little. The Annals of the College record: "Oct. 6, 1783. The College having taken into consideration the Practice of Midwifery resolved that Licences be granted to Practitioners in Midwifery."

This was a tentative arrangement, an expedient to obtain some measure of control over a growing speciality. Only ten licenses were eventually granted. Even these few, according to Spencer, served to raise the status of midwifery. As nine[22] of the ten were staff members in leading London maternity institutions, they may have been induced to become candidates.

The first candidates were Thomas Denham and William Osborne who became Licentiates on December 22, 1783. As they were both members of the staff of the General Lying-in Hospital, next came the turn of the British Lying-in Hospital whose candidates were Michael Underwood and Charles Combe.

In seeking this license of the College of Physicians, Underwood was not turning away from failure in surgery, but towards success in midwifery. Though officially a surgeon, he had specialised in obstetrics from the outset of his career. A surgeon practising midwifery was apt to be associated in a lady's mind with knives, saws, chisels, and other terrifying tools. Moreover, the well-to-do often preferred to be delivered by a physician, who was regarded not as a craftsman, but as a person of better breeding and training.

At the British Lying-in Hospital it was ordained: "That no Surgeon of this Hospital, who shall take upon himself the Degree of a Doctor or Licentiate in Physic, be elected a Physician in Ordinary to the Hospital, unless he shall have attended as acting Surgeon in this Hospital for at least five years." Underwood had attended for eighteen years when he got the chance to become a candidate for the license that would open the way to promotion and wealth.

Inspired to seek the license early in 1784, Underwood had formally to

[22] The hospital affiliations, if any, of the tenth Licentiate, Thomas Savage, are not reported.

satisfy the College examiners before it could be granted to him. The grant was announced on April 5, 1784; and the Company of Surgeons forthwith charged Underwood with violation of their by-laws. The Company of Surgeons was rightly jealous of its dignity and authority. To renounce allegiance to the Company was unusual. Such a thing had not happened for eighteen years. Since the chartering of the Company, Underwood was only the sixth renegade.[23] In the eyes of the Company, renunciation was reprehensible and called for a procedure appropriate to its gravity. According to this, Underwood should have prayed the Company to withdraw the franchise it had granted him in 1764; and having been penalised and disfranchised, he should then have sought the Company's permission before venturing to present himself as a candidate for the license of the College of Physicians. And the College, for its part, before admitting Underwood as a candidate, should have required at least proof of his disfranchisement.

Summoned on charges, Underwood apologised to the Company. Wall reports the apology but not its content. Under analogous circumstances, William Hunter of the British Lying-in Hospital, on becoming a Licentiate of the College, was disfranchised and fined forty pounds, and a further fine of twenty pounds was imposed for failure to seek beforehand the Company's consent. Wall does not state the penalty exacted from Underwood on disfranchisement: for obtaining the College license without the previous consent of the Company, Underwood was fined twenty guineas—which he paid.

It was the age of Wilkes, when vituperation was an art and enemies made use of whatever they found in the dens of their minds. Yet in the accessible literature of the period, the only unfriendly references to Underwood deal with his indiscriminate over-use of exercise and escharotics in the treatment of ulcers. Such references seem judicious and restrained. But all that was then written cannot now be traced, and what was said has long since been lost in silence. When Underwood publicly defended himself, the charges he tried to refute were disdaining the Surgeons' Company and exploiting the ulcerous.

Of both these charges, the facts known to Underwood exonerated him. This unique vindication may not have brought him much comfort, yet for five years Underwood, the unjustly accused, suffered Underwood, the cautious attorney. Then he issued his defence. What led him finally to publish it is not clear. Perhaps he took years to make up his mind that his silence

[23] The others were William Hunter (1756), Christopher Kelly (1758), James Ford (1763), Samuel Chapman (1765), and Robert Bromfield (1766)—all obstetricians.

was hurting his practice. Be that as it may, in 1788, alleging an unsatisfied demand for the tract "Upon Ulcers," he re-issued it, "Enlarged, Revised, and Defended." It was renamed, perhaps in appeasement, *Surgical Tracts, Containing a Treatise upon Ulcers of the Legs.* Sir Caesar Hawkins being dead, Underwood addressed the Master, Wardens, and Court of Assistants of the Worshipful Company of Surgeons, "dedicating this revised edition to you . . . and claiming your protection." "However devoted of later years to another branch of medicine," Underwood avowed he was "still proud of having received his first education under the Best Surgeon in the world."

As evidence that his former surgical interests were not restricted to ulcers, this new edition of the tract was enlarged by two chapters, one on the eye, the other on gangrene—both elementary. Eight years earlier James Ware, a member of the Surgeons' Company, had published his classic work on "Ophthalmy." Underwood said of it (p. 30): "Had I seen this useful publication before I prepared the present tract, I should not have thought of writing on the subject." About gangrene he was even more modest, contenting himself with endorsing the prevailing treatment with opiates, and using the occasion to propose that a Royal Academy of Surgery be founded to foster the art and do honor to the eminent among its masters.

The preface to this enlarged edition reads in part: "The author has had abundant Evidence from his own Experience, and from the Testimony of others, of his labours having been productive of much good. . . . His Aim and Expectation from the first was Public Good, and he has certainly less temptation than ever to inferior motives in the present publication. . . ." Its purpose was "to save the writer the mortification of having his first attempt thought inferior to the dignity of a first class practitioner. Besides, any attempt must be laudable to rescue this branch from the hands of quacks and ignorant pretenders [p. xi]." And "especially he thought it incumbent upon him, as it is probable he may not take up his pen again on chirurgical subjects," to reply to his critics. In other words, this re-issue of the tract on ulcers was a sort of apologia for his life as a surgeon, and a plea by the fifty-year-old fledgling physician that he be permitted to say his "nunc dimittis" to the members of the Surgeons' Company in peace.

His desire for peace led him to surrender without protest the claim he had insinuated in 1783 that the expectant treatment of the inflamed breast had originated with him. "I cannot avoid," he wrote (1788, 53), "taking notice in this place that whilst in one review this practice is said to have been long understood and even published to the world (though I must still

confess I never happened to meet with it). . . ." And he further conceded: "Objections are made to leaving milky abscesses to burst of themselves, and perhaps some of the first surgeons may be of the same opinion; which renders the point very worthy of discussion."

On ulcers, however, he was perforce the Underwood who once confided to his diary his need to make his "own story good, more ashamed of being thought wrong . . ." than that "his neighbour should greatly suffer." When adding the essay on gangrene he may have meant at first to warn of the possible effects of his escharotics and tight bandaging; but if such was his original intent he gave it up, and presented the emasculated essay with the remark: "I design to say so little that it might as well be suppressed [p. 65]." He was almost equally reticent about the agony of walking on sloughing legs, though he admitted there were times when excessive inflammation and œdema might make rest necessary and desirable.

On his claims for his method of treating ulcers, he made no concessions, even to the first surgeons. Instead, he found himself having "to lament that there are yet individuals of high rank in the profession who satisfy themselves with giving testimony altogether against a plan of which they have not been pleased to make a trial, either in their hospital or private practice." Offsetting them, he quoted an unsolicited testimonial, "not more flattering than many others," dated January 11, 1787, from one T. Smyth, of Cherry Orton, near Peterborough, which read: "I have often been astonished at the ease with which I cure large and old Ulcers of the Legs by a strict adherence to the rules you lay down, after they have withstood every other mode I had previously been acquainted with [p. xix]."

In replying to Benjamin Bell, Underwood revealed a skill he had hitherto reserved for theological disputation. He wrote (1788, p. 76):

> I have been somewhat surprised since the first appearance of this tract to find that so attentive and judicious a practitioner as Mr Bell should, in the last edition of his treatise upon ulcers, so strongly inculcate the necessity both of lenient applications and rest, in the cure of ulcers of the lower extremities; without offering one argument in support of the latter, or attempting to answer to those I had advanced. Having barely mentioned my opinions, he observes that he has tried every method that has been published in the world, and has succeeded in all of them; but that he finds no cure so easily or speedily obtained, nor any that prove so permanent, as those effected by mild dressings and rest. Now, such sentiments, especially the latter, appear to me very extraordinary indeed, but being only assertions, I may, with the strictest regard for truth, venture in return to assert that, besides all that has been adduced as evidence, in a way of reason or argument, my own experience and that of a number of others, in hundreds of instances, runs directly the contrary way. And I venture

farther to suggest that if Mr Bell will be at the pains of dressing his patients with his own hands, will roll up the legs constantly himself, and by the due use of active applications will procure a sound surface to ulcers, he will meet with many that will be healed sooner, numbers more certainly, and *all* more *permanently* than by mild dressings and absolute rest.

In the Library of the Royal College of Physicians of Edinburgh there is a copy of *Surgical Tracts* (1788), inscribed "To Mr Bell with the author's compliments." If sent as a challenge, it was ignored by Bell.

Underwood's Portrait (?)

Mr. W. R. Le Fanu, M.A., the learned Librarian of the Royal College of Surgeons of England, kindly called my attention to a photograph in the Library of a portrait reputed to be of Michael Underwood. The owner of the portrait is J. E. Scatcherd, Esq., of Chislehurst, Kent. It is attributed to John Zoffany (1733–1810), who repeatedly painted Underwood's royal patroness, Queen Charlotte, and twice, Underwood's whilom colleague at the British Lying-in Hospital, William Hunter. Also attributed to Zoffany are portraits of Sir Caesar's brother, Sergeant Pennell Hawkins, and of Caesar H. Hawkins. He painted other surgeons and physicians, among them, Sir Richard Jebb, John Heaviside, Dr. William Russell, and William Sharp.

The half-length portrait, which is said to represent Michael Underwood, depicts a slightly built man, of rather less than average height and spare habit. Against an almost black background he is seated on an upholstered dark red divan, or armless chair, with a high, broad back. On his head is the conventional powdered wig, tied behind with an unusually large bow of black ribbon, and round the neck is a white stock. He is soberly clad in a long, dark brown coat, the front of which displays on each side a vertical row of five or more large gilt buttons bearing a stamped design which is not uniform. The sitter has a plain, interesting face with a broadish brow, large, alert, dark blue eyes, and a longish, low-bridged nose that at the point broadens and turns up somewhat. The mouth is tight lipped, the lower lip being fuller than the upper. The complexion is fresh, the expression serious—almost anxious, and the age about fifty.

Acknowledgment

To the assistants of the Librarian of the New York Academy of Medicine, especially Miss G. L. Annan; to Thomas H. Graham, Esq., O.B.E., Librarian of the Royal College of Physicians of Edinburgh; Mr. W. R. Le Fanu, M.A., Librarian of the Royal College of Surgeons of England; and to the staff of the Wellcome Medical Research Library, London, I am grateful not merely for routine aid, but also for resourceful counsel and much patience and kindness. My thanks are due to Mr. Scatcherd for permission to reproduce the Zoffany portrait. The photograph of it is by A. C. Cooper, London, England. Mr. G. F. Osborn, archivist of the Westminster Branch Library, Buckingham Palace Road, showed me the Underwood entries in the rate books for Marlborough Street; and Mr. G. Stephens furnished the information on Underwood in Margaret and in Holles Streets from the rate books at the Public Library, St. Marylebone.

BIBLIOGRAPHY

BAAS, J. H. *Grundriss der Geschichte der Medizin,* tr. W. E. Handerson. New York, 1889, p. 1154.

BAILLIE, G. H. *Watchmakers and clockmakers of the world.* 2d ed. London, 1947, p. 292. (The clockmakers are listed alphabetically.)

BAYLE, A. L. J., and THILLAYE, A. J. *Biographie médicale.* Paris, Delahays, 1855, p. 408.

BLOMFIELD, J. *St. George's, 1733–1933.* London, The Medici Society, 1933, pp. 15, 23, 27.

BRITTEN, F. J. *Old clocks and watches and their makers.* 3rd ed. London, 1911, p. 760.

Christian Observer. London, October 1823, vol. 23, no. 10, p. 656.

DÉCHAMBRE, A. *Dictionnaire encyclopédique des sciences médicales.* Paris, Masson, 1886, 5th ser., vol. 1, p. 56.

DÉZEIMERIS, J. E. *Dictionnaire historique de la médecine.* Paris, Delahays, 1839, vol. 3, p. 297.

Dictionary of Universal Biography, Albert M. Hyamson, *Ed.* London, Routledge, 1916, p. 668.

ELSE, Joseph. Account of a successful method of treating sore legs. *Medical observations and inquiries.* London, 1771, *4*, 347–354.

HIRSCH, August. *Biographisches Lexikon der hervorragenden Aerzte.* Vienna and Leipzig, 1888, vol. 6, p. 45.

MATHEWS, Anne. *Memoirs of Charles Mathews, comedian.* By Mrs. Mathews. London, 1838, vol. 1.

MUNK, William. *The roll of the Royal College of Physicians in London.* 2d ed. London, 1878, vol. 2, p. 336.

MUSGRAVE, William. *Obituary prior to 1800.* London, Harleian Society, 1901.

NICHOLS, John. *Literary anecdotes of the eighteenth century.* London, 1812, vol. 3, p. 728.

ROYAL COLLEGE OF PHYSICIANS, London. *Annals* (1783), vol. 15, p. 35. Quoted by Munk, *q.v.,* vol. 2, p. 334.

SPENCER, H. R. *The history of British midwifery from 1650 to 1800.* London, 1927, p. 176.

STILL, G. F. *The history of pediatrics.* London, 1931, pp. 466–486.

WALL, Cecil. *The history of the Surgeons' Company, 1745–1800.* London, 1937.

WARE, James. *Remarks on the ophthalmy* [etc.]. London, 1780; 2d ed., 1787.

YOUNG, Sidney. *Annals of the barber surgeons.* London, 1890.

Observations on Fused Kidneys with Horseshoe Configuration: The Contribution of Leonardo Botallo (1564)*

JOHN A. BENJAMIN† AND DOROTHY M. SCHULLIAN‡

THE medical sciences have been gradually developed. It is only by reviewing the studies of past centuries that we can hope to evaluate the advances in any particular field selected for examination. In this instance we are reporting on fused kidneys with horseshoe configuration. Until more recent times these were regarded by the anatomist and physician as curiosities and monstrosities worthy of the careful observation of all who pursued the study of medicine. As time passed the pathologist took up the study of this malformation, but little was added in the way of understanding what might produce this type of anomaly. Furthermore, the clinical aspects were inadequately studied and awaited the development of cystoscopy, ureteral catheterization, and roentgenology to provide means for better correlated clinical studies. And only recently has this interesting renal anomaly been produced experimentally in the fetus of the rat.

Jacopo Berengario da Carpi, it appears, was among the first to write on this subject:[1]

> I myself saw also in 1521 in a public dissection in my study at Bologna one artery [renal] from the emulgents making a channel on the right side beyond the kidney which at an extraordinary distance below the kidney went along the ureter arising from the above-mentioned kidney, and both went through as one channel to the bladder. However this emulgent [renal] artery also entered the kidney at the usual place, and in this individual the kidneys were continuous, like one kidney, and it had two veins and two emulgent arteries and two ureters, with only one enveloping panniculus[2] which occupied the usual place of the

* This study was supported by funds from the Dr. Henry C. Buswell Memorial.

† Department of Surgery (Division of Urology), University of Rochester School of Medicine and Dentistry, Rochester, New York.

‡ History of Medicine Division, Army Medical Library, Cleveland, Ohio.

[1] Berengario da Carpi, Jacopo, *Isagogae breves* (Bologna, 1523), f. 17b:

> Ego ipse etiam vidi anno 1521 in studio nostro Bononiensi anatomizato publice arteriam unam ex emulgentibus facere unum porum in parte dextra extra renem qui in notabili distantia infra renem ingrediebatur porum uritidem a praedicto rene ortum; et ambo per unum canalem tendebant ad vesicam. Haec tamen etiam arteria emulgens ingrediebatur renem in loco solito; et in isto individuo renes erant continui ac si esset unus ren; et habebat duas venas et duas arterias emulgentes; et duos poros uritides cum uno solo panniculo involvente qui occupabat loca solita renum; et etiam medium dorsi; quod est in loco inter splenem et hepar parum infra ea.

[2] A similar finding is recorded for the normal kidneys by W. W. Keen in "A note on the anatomy of the perirenal fatty tissue," *Amer. Med.*, 1903, *5*, 171, ". . . [the perinephric fatty tissue] is continuous across from one kidney to the other."

kidneys and even the middle of the back, which is in the position between the spleen and the liver, a little below them.

A diagrammatic representation of Berengario's probable anatomical findings is offered to the reader in Figure 1. Johann Guenther von Ander-

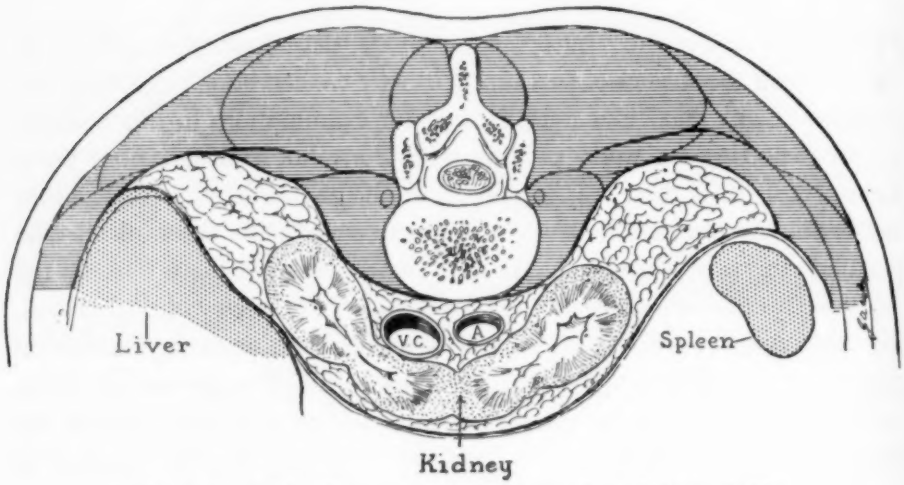


Fig. 1. Composite diagrammatic representation of the probable anatomical findings of Berengario da Carpi.

nach, Andreas Vesalius, and Charles Estienne had likewise made mention, somewhat more briefly, of a single kidney, but we are not assured that these eminent men of medicine and anatomy observed fused kidneys with horseshoe configuration. Bartolomeo Eustachi urged further study of the anomaly.[3]

But probably the first to describe, illustrate in detail, and legendize this interesting malformation, and to compare it with the normal kidney, was Leonardo Botallo (Figure 2),[4] with whose work Morgagni was clearly familiar when he wrote, "And that which is describ'd, and represented in a plate, by Botallus and was so large as to seem to be made up of four, is

[3] Cf. Morgagni, John Baptist, *The seats and causes of diseases* . . . translated . . . by Benjamin Alexander (London, 1769), vol. II, pp. 717–719.

[4] Botallo, Leonardo, *De catarrho commentarius . . . Addita est in fine monstrorum renum figura, nuper in cadauere repertorum* (Paris, 1564) pp. 86–[93]. The tract is also found in Botallo's *Commentarioli duo, alter de medici, alter de aegroti munere* . . . (Lyons, 1565), pp. 171–179 and in the edition of his *Opera omnia* with notes by Johannes Van Horne (Leyden, 1660), pp. 59–64. Van Horne presents the text not immediately following the tract *De catarrho*, as it occurs in the two earlier editions, but as the first of two "Observationes anatomicae." Accordingly he has deleted from the text at two points lines which refer to the tract on catarrh. The translation included in this paper is from the 1564 edition.

extremely well known."[5] Certainly the more careful anatomical observations concerning the fused kidney with horseshoe configuration begin with the work of Leonardo Botallo. It is therefore the purpose of this report (1) to emphasize the anatomical contribution of Botallo, (2) to consider what may produce this interesting malformation, and (3) to present very briefly recent data concerned with the experimental production of the anomaly in the rat fetus. Such a presentation will, it is hoped, awaken the reader to a realization of the advances made in the field since the time of Botallo almost four hundred years ago.

The following translation will lay before the reader the important contribution of Botallo:

Concerning A Monstrous Kidney Which Was Recently Found

Some students of the medical art had earnestly requested me to show them on a cadaver, if I would, how the bone of the head ought to be pierced . . . and by what device an outlet is given to the pus or blood retained in the thorax, as in those suffering from abscesses or suppurating sores, or wounded in that part of the body; likewise they wanted to know in what manner water, as in the case of dropsical persons, can be drained off in the lower belly and how dilated veins or other blood vessels, whether veins or arteries, whose functioning medical skill undertakes to prohibit utterly, ought to be cut off. On these matters I had already expressed myself once, and in the present affair I did not feel that I could refuse to comply with their wishes.

So a cadaver was offered to me for the purpose, and I set forth on it what I have mentioned above, and then in addition, since I thought it not at all right to neglect the other anatomical parts which had not been examined, subjected the whole corpse to dissection. But when we came to the kidneys, there we saw that nature had played such a trick that no small wonder was aroused in all those who were watching, as it would be likewise in all those skilled in anatomical dissection who saw the appearance of those kidneys, which we have judged worthy to put before the sight of men. Perhaps to someone it will seem strange that this account of the kidney is inserted after the tract on catarrh, since it deals rather with anatomy [than with subjects related to catarrh]. But as it is not unsuitable (and in fact it happens very often) for a writer when he has finished one discussion and sometimes even when he has not to begin on a different subject, so we ought not to be blamed for this. Moreover it was mere chance that this cadaver fell into my hands, because it had been cast away with the likeness of the kidneys, so monstrous and unseen by all previous ages,[6] not laid open. Monsters also are the result of chance. But things which happen by chance follow no order; accordingly we too shall be allowed now to add this outline here out of order, or at least with no relation to the preceding tract. One may observe also

[5] Morgagni, *op. cit.*, p. 718.

[6] Botallo was apparently not familiar with earlier observations on the anomaly (see footnote 1).

[7] The *Praxis medicinae* of Pierre de Gorris was published in Paris in 1555.

that whatever, without any danger of injury, can bring honest pleasure or profit to all or very many men can opportunely be introduced at any point.

Consider then, kind reader, a form of kidney which is not feigned or fabricated (as it appeared to some of the most celebrated Paris physicians, namely the masters Gorraeus,[7] Magnus, and Baldichius, and besides to innumerable scholastics, when Jacobus Dioneus,[8] a young man very learned and most zealous in the medical art, was dissecting a corpse) but rather faithfully and accurately drawn from the original by a very good and upright artist and immediately marked by me with letters. It is presented in this way so that the manner of the entire composition can be understood with less pains even though the reader is not skilled in the art of anatomy. For there are four kidneys joined in one mass, but divided among themselves by channels [infundibula],[9] passages [ureters], and vessels [arteries and veins], as the figure shows. There were even a greater number of channels [infundibula] from the drains [calyces] than are marked, but because of their smallness I wanted only those which were more exposed to be reproduced.

There is no need of proceeding here at greater length to set down the cause of an arrangement so abnormal and foreign to the right order of nature, since nature has equal power and equal impotence over the kidneys as with other parts of the body, which she sometimes doubles, sometimes mutilates, sometimes makes larger, sometimes smaller, and at times utterly different from the natural form. And all this comes about because of too much material, or a lack of it, or because of impeded action which can arise from various causes which it would be superfluous to enumerate here, since anyone can assemble them from Aristotle's *Physics* or from his book on the *Generation of Animals*.[10] What it is appropriate for us to add here is this, that we can assume that this man was lustful because of the abundance of seminal vessels; moreover that if he had lived longer (which nature might by chance have granted him, since otherwise she had constructed him in the best condition of body, but the law removed this assassin on the gallows and punished him for his savage deed) it must be judged that his left leg would have been subject to edematous tumors because of the emulgent [renal] vein which ran above the kidney and straightway joined the femoral [common iliac]; for in the meantime, while he was still strong in his natural forces (for his face indeed showed that he had not passed his fortieth year), the kidney was removing large amounts of serous fluid; however, if something did change, it was easily removed during exhalation by exercise and by native robust warmth, a thing which he could not have performed as fully if he had passed the age of virility.

His stomach was also very large, his whole body fleshy and strong. His tibias and greater focilia [femora] were thick beyond measure, and had a rounded form, the fibulas smaller than befitted his habit of body, and the spleen, in addi-

[8] A Jacobus Dionneau of Le Mans, who died 10 December 1588, is listed as a royal surgeon of Paris in Girodat, *Recherches critiques et historiques sur l'origine, sur les divers états, et sur les progrès de la chirurgie en France* (Paris, 1744), p. 548.

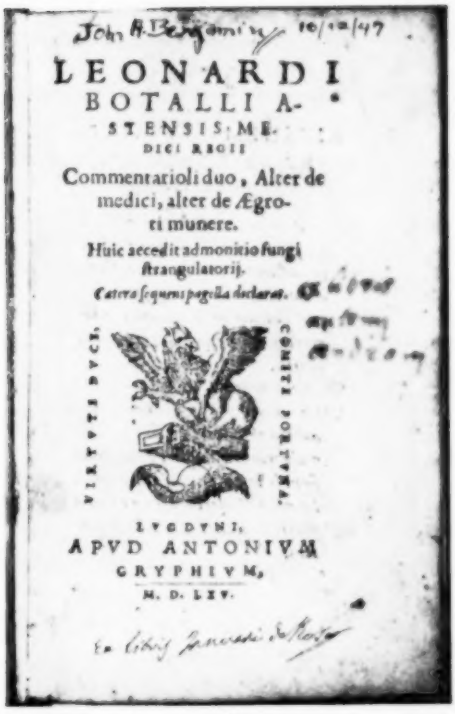
[9] In Botallo's illustration of the horseshoe kidney the infundibula are clearly exteriorized. Figure 8 shows exteriorized infundibula, *not* from a horseshoe kidney, but as found in a patient during surgical exploration at the Strong Memorial Hospital (D.P., 128696).

[10] In this work Aristotle states: "Alterations and deformations occur in respect of the inward parts too; animals either lack certain parts, or have them in a mutilated form, or have too many of them, or in the wrong places. No animal, it is true, has ever been born without a heart, but there have been animals without a spleen, and with two spleens, and with one kidney" (Loeb ed., tr. by A. L. Peck, 1943, IV.4.771a).

DE
CATARRHO
COMMENTARIVS,
Authore Leonardo Botallo Astense medico Regio.
Addita est in fine monstruosorum renum figura, nuper in cadavere repertorum.

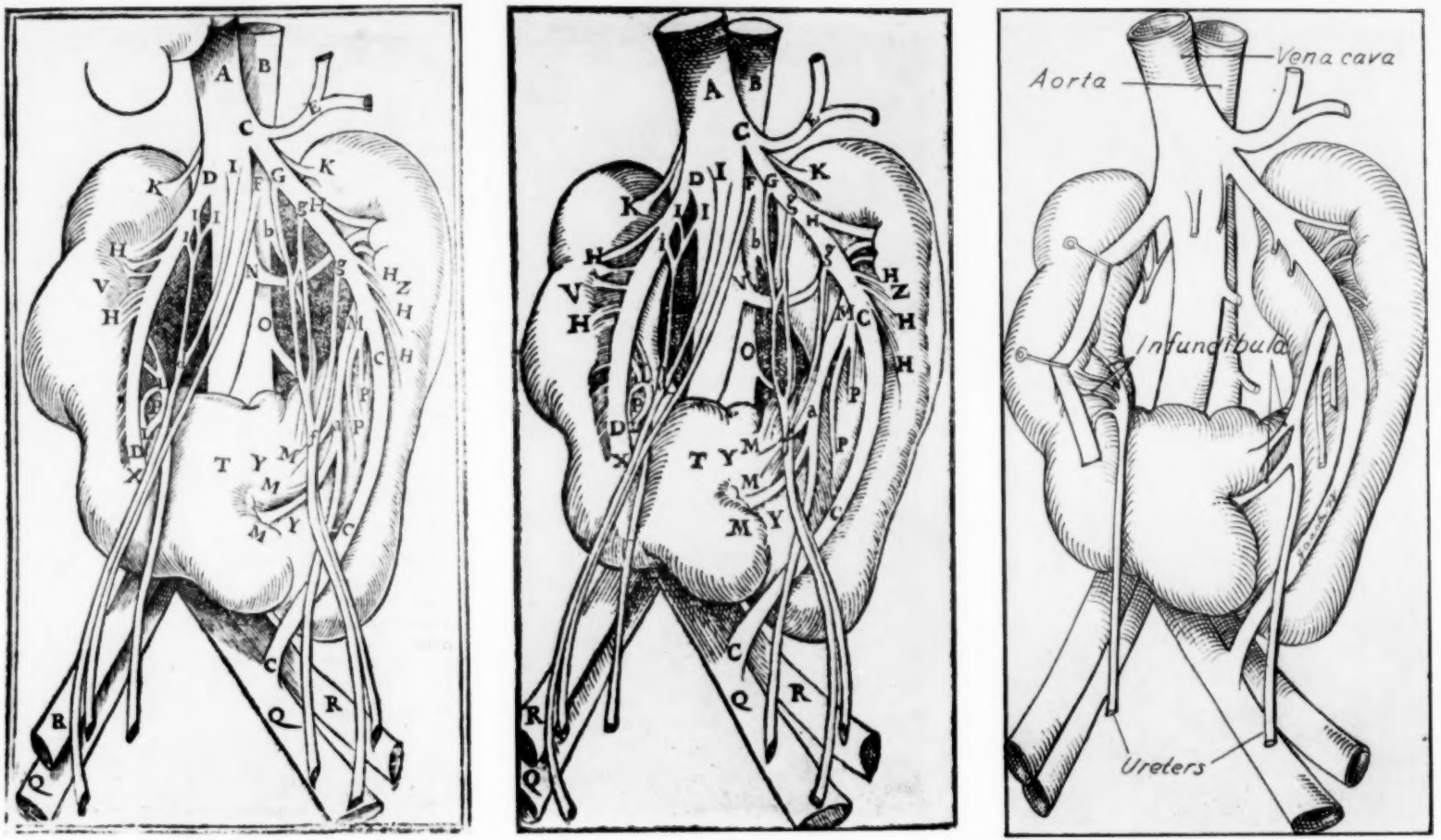
PARISIIS,
Apud Bernardum Turrisanum via Iacobæa,
in Aldina Bibliotheca.
1564.

a



b

Fig. 2. *a*. Title-page of Botallo, 1564. Courtesy of the Army Medical Library.
b. Title-page of Botallo, 1565.



a *b* *c*

Fig. 3. *a*. Botallo's illustration of fused kidneys with horseshoe configuration, 1564, p. [90]. Courtesy of the Army Medical Library. *b*. Same figure from 1565 edition, p. 176. *c*. Pen and ink drawing by Mr. Natt C. Jacobs using *b* as a model.

tion to the vessels which run commonly to the upper opening of the stomach, had two others, fairly clear, which were attached to the fundus.

[*Explanation of Botallo's Illustration of Horseshoe Kidney*]
(Figure 3)

A. Vena chilis or cava.
B. Arteria magna, or aorta.
CCCC. Left emulgent vein which is not carried to the kidney but inserts many channels [veins] in it and proceeds downward itself, clinging to the capsule of the kidney, and finally is joined to the *femoraria* [common iliac] near Q.
DD. Right emulgent vein which also is carried above the kidney to the letter X, where it is distributed in the lower right sinus.
E. Vena adiposa [left adrenal vein].
F. Right seminal artery.
b. Left seminal artery.
Ggg. Left seminal veins which are mutually joined and become one at f.
f. Place where several seminal veins are joined together and become only one, springing from the left emulgent.
HHHH. Various channels produced from the left emulgent which are distributed into the left upper sinus.
IIII. Right seminals, two of which are from the vena chilis, two from the emulgent, coming together at d.
d. Place of union of the seminals arising from the right side.
KK. Twin arteries inserted the one at the top of the right kidney, the other at the top of the left.
LL. Multiple channels [infundibula] of the ureters, some of which come from the upper sinus, some from the lower, coming together near p [pelvis].
P. Place where various channels [infundibula] of the ureters coming from both right sinuses are joined.
MMMM. Channels of the upper left ureters, and of the lower, which come together at a [bifid pelvis].
a. Place of juncture of the left ureters.
N. Another left emulgent which is attached to the upper sinus.
O. Artery which is inserted in the lower left sinus.
PP. Prolongations of the veins arising from the left emulgent, inserted in the left and lowest ventricle or sinus.
QQ. Femoral veins, namely the right and left.
RR. Femoral arteries, namely the right and left.
T. Place where the one artery of notable size springing from the arteria magna is inserted, but at a point placed beneath [dorsally] which lies above the arteria magna and the vena magna; moreover the arteria magna begins to rise within O and N above the vena cava as is clear on the diagram.
V. Place of the upper ventricle or right sinus of the kidney.
X. Place of the lower right sinus.
Y. Region of the lower left sinus.
Z. Region of the upper left sinus.

Since things different or diverse become clearer when placed near one another, I have added here also a diagram of the normal kidneys, so that the difference between the two may be more pronounced (Fig. 4).[11]

For this contribution, made almost four hundred years ago at a time when anatomy and medicine did not yet enjoy the remarkable advances which investigational studies have granted to later ages, Botallo deserves much praise. He realized that dissection and examination of specimens are necessary to the proper teaching of anatomy. He believed that the teacher and ultimately the student should, from a sound acquaintance with the structures of organs, be able to distinguish between normal and abnormal specimens, and proceed to compare and evaluate them properly. He appreciated the value which rests inherently in an illustration above and beyond many written words of description, and he considered it an obligation to delineate with clarity and precision, at the time of the dissection and not later, the horseshoe kidney on which he had happened quite accidentally. To his illustration, indeed, might be applied the words which Jarcho[12] used for a similar illustration (Figure 5)[13] published almost a century later by Thomas Bartholin: "The fine details of the illustration attract the reader's attention at once." It matters little that the illustration of Botallo early in the present century underwent considerable modification at the hands of copyists (Figure 6). Certainly both it and that of Bartholin are quite superior in accuracy and artistic skill to the one published by Tyson in 1678 (Figure 7).[14]

[11] It is immediately clear that the letters as designated in the legends given by Botallo in the 1565 edition do not always agree anatomically with the letters as marked on the illustration. The following corrections should be noted: A. Right kidney; B. Left kidney; CC. Right and left ureters; FF. The two emulgents or renal veins. Van Horne (see footnote 4) made similar adjustments. Figure 4a (1564) shows correct dorsal view with the common iliac veins lying behind the common iliac arteries. Figure 4b (1565) shows correct ventral view in which the common iliac arteries lie above the common iliac veins. Van Horne showed the same as seen in the 1565 edition. In all instances the left kidney is a little higher than the right which is the usual finding among normal kidneys.

[12] Jarcho, Saul, *J. Mt. Sinai Hosp.*, 1942, *8*, 656.

[13] Bartholin, Thomas, *Historiarum anatomicarum rariorum centuria, I et II* (Hafniae, 1654), p. 307. Jarcho used the 1659 edition.

[14] "The Explication of Fig. 1, Tab. 1" (from Tyson, see Figure 7):

A. The right kidney.

B. The left kidney.

C. The middle part conjoyning both kidneys.

d.e.f. Three seams in the tunicle of the kidneys.

G. The arteria aorta.

hh. Two arteries from the aorta which afterwards are ramified into three, and so inserted into the said middle part.

I. The vena cava.

KK. Two veins arising from the middle part which uniting into one, entred the vena cava.

L.M. A vein and artery arising at the seam (f) which at last are both inserted into the iliac branches of the aorta and vena cava.

NN. The emulgent artery of both kidneys, whose ramifications are not here represented.

OO. The emulgent veins; whereof some are single, others variously ramified.

PP. Pelvis of both kidneys, that of the left was extream large.

QQ. The two ureters.

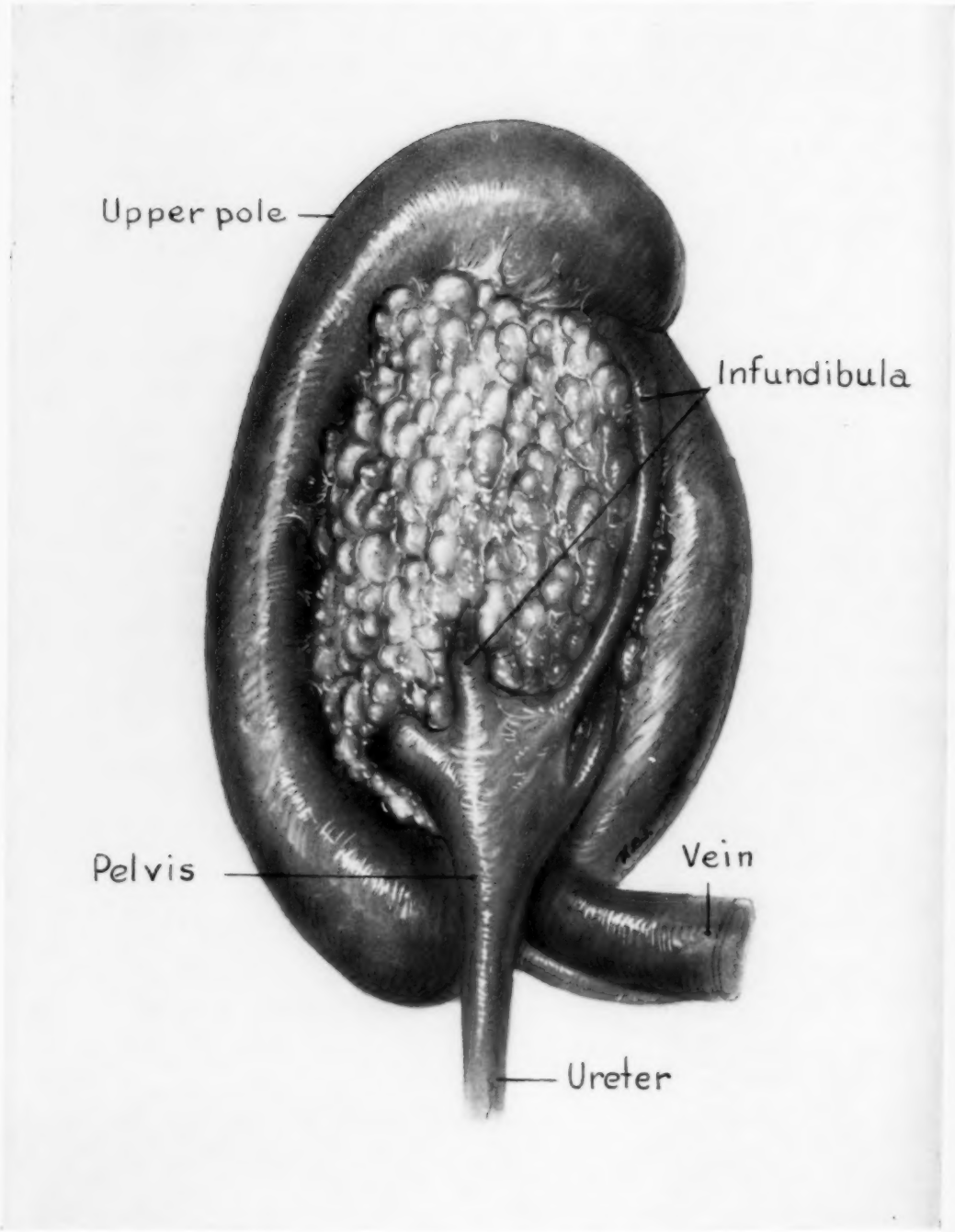


Fig. 8. Exteriorized infundibula in a single kidney with medial rotation for comparison with the exteriorized infundibula in the horseshoe kidney from Botallo.

From the anatomical point of view the description and illustration of the horseshoe kidney from Botallo present points of agreement and of disagreement with modern observations on this type of kidney. Apparently he was not aware of the fact that he was probably the first to illustrate exteriorized infundibula in a horseshoe kidney, for he makes no statement to this effect.[15] Since he had compared the horseshoe kidney with a normal one, it would seem likely that he would have been able to observe this difference in the anatomical fabrication (Figure 8). Furthermore, he illustrated only two ureters[15] but stated that he had found four kidneys. It would appear from his text and legends that he did not realize that in order for this conclusion to be adequately supported it would be necessary to have, in some stage of formation, four ureters. He made no statement as to the number of ureteral orifices appearing in the bladder; in fact, we have no evidence that he examined the bladder. We know that two ureters can start from either kidney, finish as a single ureter on either side, and so receive representation as a single orifice in either side of the trigone of the bladder (Figure 9); that there may be two orifices on one side of the bladder representing two ureters, and a single ureter and orifice on the other side of the bladder (Figure 10, I); or that, as also in the case of Swick,[16] two ureters and two orifices may be represented in either side of the trigone (Figure 10, J).

The modern anatomist examining the contribution of Botallo is struck by his references to the variability and number of blood vessels which he saw. In such observations Botallo anticipated by almost four centuries the studies of workers far better equipped than he to engage in anatomical research. Robinson,[17] for example, pointed out after examination of sixty specimens and illustrations that the blood vessels in the fused kidney vary greatly in number, formation, length, and symmetry. One may in fact expect to find vessels either excessively long or excessively short, and in addition an abundant blood supply through the arterial tree (Figure 11). Specifically, Botallo noted the artery to the isthmus x which corresponds rather closely to one specimen of Robinson.[18] Robinson found that the parenchyma of the isthmus was supplied by a distinct artery in twelve of his

[15] Figure 3c sets forth more clearly the exteriorized infundibula and two ureters than do the illustrations from Botallo.

[16] Swick, Moses, "A quadruple kidney with a horseshoe component demonstrated with the aid of excretion urography," *J. Mt. Sinai Hosp.* 1937, *4*, p. 8, Fig. 1.

[17] Robinson, Byron, "The blood vessels in fused (horse-shoe) kidney; based on the study of sixty specimens and illustrations," *Lancet-Clinic*, Aug. 7, 1909, *102*, 141–148.

[18] *Ibid.*, p. 147, fig. 51.

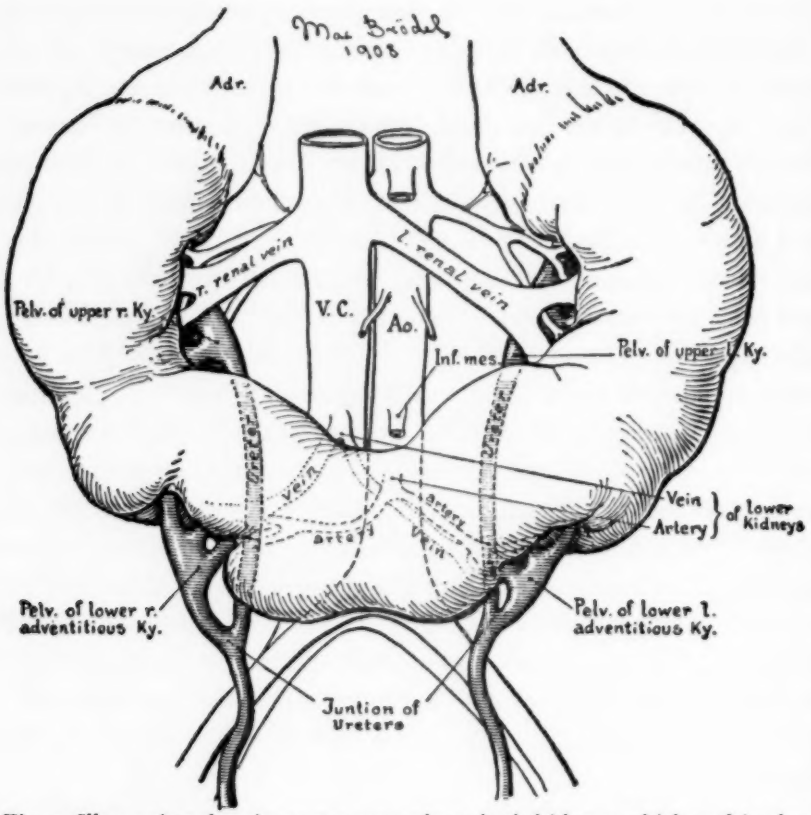


Fig. 9. Illustration showing two ureters from both kidneys which end in the bladder as single ureters. Reproduced by permission from Kelly and Burnam, *Diseases of the kidneys, ureters, and bladder* (New York, D. Appleton & Co., 1915), vol. II, p. 316, fig. 449.

sixty specimens. Renal arterial anomaly may be associated with the parenchyma without horseshoe configuration (Figure 12).[19]

In the venous system Botallo showed the left renal vein joining the femoral (common iliac) and thereby became the first to our knowledge to record this vascular anomaly. Baxter Tyrie[20] later found termination of the inferior mesenteric in the left renal vein, but not in association with a horseshoe kidney.

This whole matter of vascular patterns is very useful to any discussion

[19] See also Crelin, Edmund S., Jr., "An unusual anomalous blood vessel connecting the renal and internal spermatic arteries," *Anat. Rec.*, 1948, *102*, 205–211. Eustachi in his *Opuscula anatomica* (Venice, 1564), f.9a, tab. III, bottom figure, illustrated a renal arterial anomaly. In a kidney which was not a horseshoe kidney he showed a slender artery emerging from the anterior surface of the renal parenchyma and joining what is probably the right hypogastric artery (Figure 12).

[20] Tyrie, C. C. Baxter, "Axial rotation of abdominal aorta, with associated abnormalities of the branches," *J. Anat. Physiol.*, 1894, *28*, 281–287.

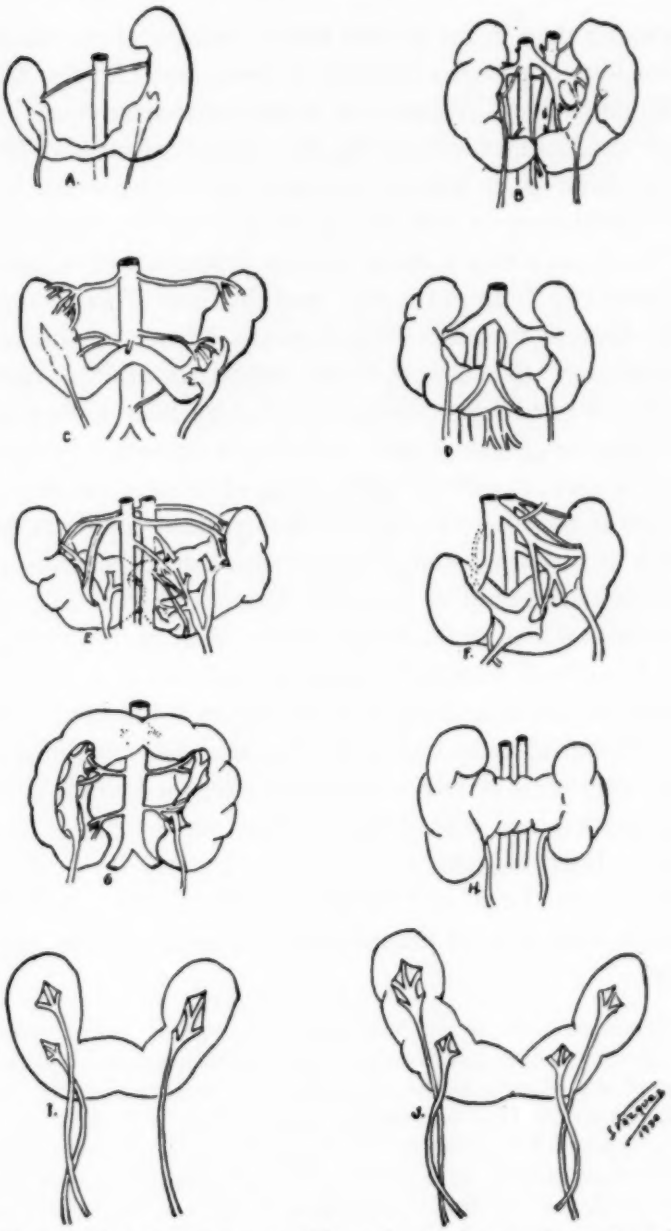


Fig. 10. Variations in types of horseshoe kidney and number of ureters. Reproduced by permission from Robert Gutierrez *(Amer. J. Surg.*, 1931, *14*, 662, fig. 3).

of what may produce or cause the horseshoe kidney. Hyrtl's "exsanguinated renal zone,"[21] for instance, is likely to be more anatomically indistinct

[21] Hyrtl, Joseph, *Lehrbuch der Anatomie des Menschen mit Rücksicht auf physiologische Begründung und praktische Anwendung.* Wien, W. Braumüller, 1887, 19. Aufl., pp. 765–774.

in the horseshoe than in the normal kidney because of the abnormal and bizarre blood-vessel patterns inherent to horseshoe kidneys. Macalister[22] stressed the point that "irregularities of the renal arteries are among the commonest varieties met with among the abdominal vessels." He was not referring to a horseshoe kidney. Certainly in the horseshoe kidney the variations could be expected to exist to an even more marked degree. The vessels of fused horseshoe kidneys tend to preserve their segmental relationship, hence supply from the aorta and the iliacs. Their branch arteries are usually distal to the main arterial trunks. These and similar observations led Robinson[23] to believe that "the presence of multiple renal arteries is due to arrest of renal development," and that the fused kidney with horseshoe configuration reveals a more primordial anatomical relationship, a reversion, as it were, to more primitive types of kidneys which possess multiple segmented renal arteries. By this theory blood supply as well as the blood vessels themselves would govern to some extent the position and type of rotation that are found in horseshoe kidneys (Figure 13), and would likewise cause variation in the length and position of the ureters. It seems clear indeed that multiplicity of vessels, ureteral variation and duplication, malrotations and fusions, changes in the pelves, infundibula, and calyces all tend to emphasize aberration of development. Some investigators, however, believe that renal vessels develop only after the kidneys have reached their final location, and that abnormal blood supply cannot be the cause of dystopia or fused kidneys.[24]

It remained for Lewis and Papez[25] to stress the instrumentality of the arteries in the formation of the anomaly. Their conclusions may well be quoted here:

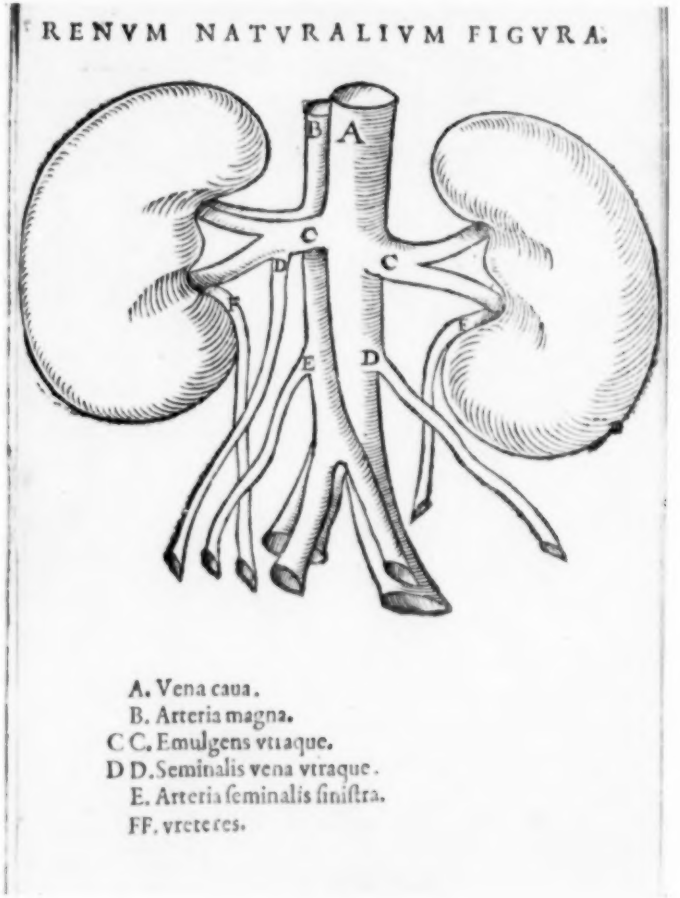
> The normal relations of the kidneys to one another varied in such a way that we may offer a new explanation of this anomaly, namely, that it is due to the relation of the kidneys to the bifurcation of the aorta into the umbilical or common iliac arteries. This bifurcation forms a U-shaped crotch in which the kidneys are lodged, and from which they escape by migrating upward. The arteries, as a mechanical obstruction, tend to bring the right and left renal blastemas close together, so that fusion may readily take place. A fusion at the upper poles, making a horseshoe kidney convex superiorly, would probably arise earlier than the fusion at the lower poles, in which case the horse-shoe would be convex inferiorly. The relations of the kidneys which seem to justify this interpretation have been demonstrated in a series of models.

[22] Macalister, A., "Multiple renal arteries," *J. Anat. Physiol.*, 1883, *17*, 250–252.

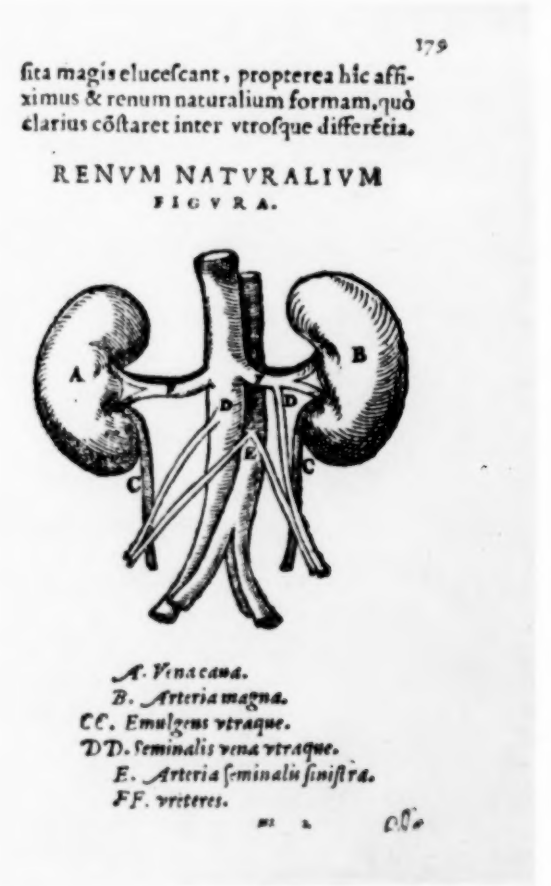
[23] Robinson, *op. cit.*, p. 145.

[24] Gruenwald, Peter, "Mechanisms of abnormal development, "*Arch. Path.*, 1947, *44*, 398–446, 495–559, 648–664; see in particular p. 537.

[25] Lewis, Frederic T. and Papez, James W., "Variations in the early development of the kidney in pig embryos with special reference to the production of anomalies," *Anat. Rec.*, 1915, *9*, 105–106.



a



b

Fig. 4. *a*. Botallo's diagram of the normal kidney, 1564, p. [93]. Courtesy of the Army Medical Library. *b*. Same figure from 1565 edition, p. 179.

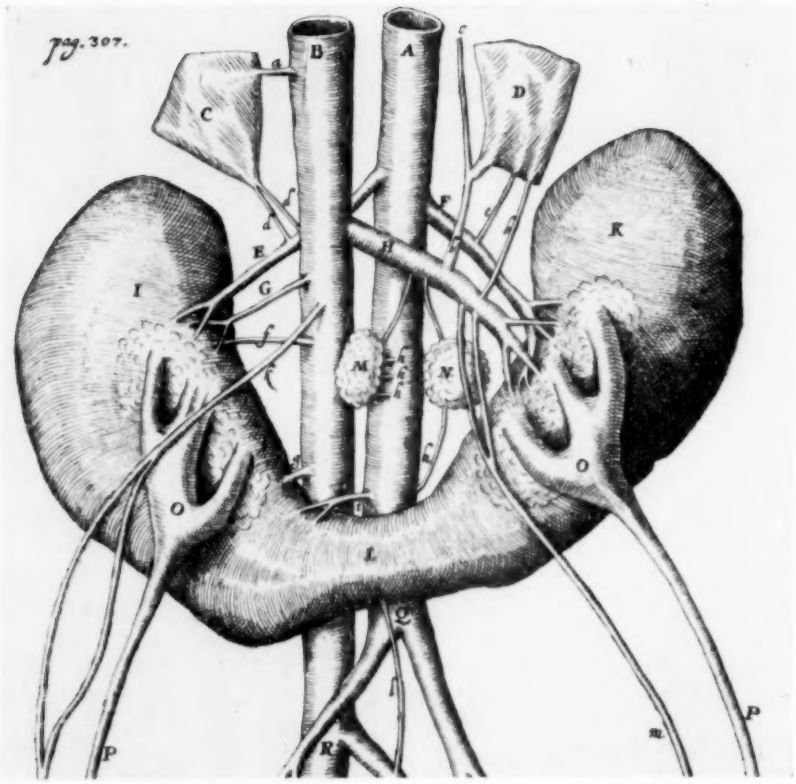


Fig. 5. Fused kidneys with horseshoe configuration from Thomas Bartholin, 1654, p. 307.

Fig. 14.—Fusion of Kidneys. The fused mass has a quadruple appearance. (*After Botallus.*)

A, Aorta; V C, vena cava; R A, renal arteries; I A, iliac artery; H A, hypogastric artery; R V, renal veins; UR, ureters.

Fig. 6. Fused kidneys, reproduced by permission from Henry Morris, *Surgical diseases of the kidney and ureter* (London, Cassell & Co., Ltd., 1901), vol. I, p. 54, fig. 14.

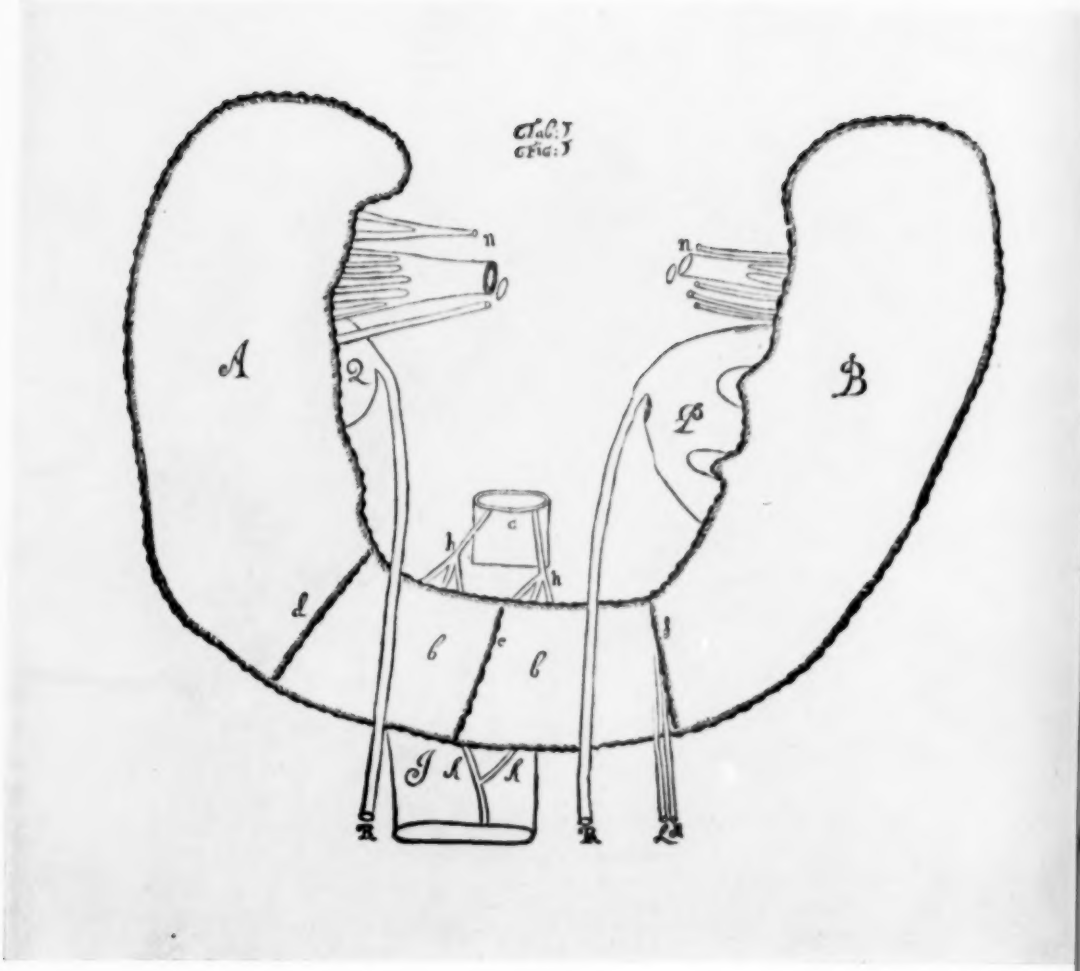


Fig. 7. Horseshoe kidney from Tyson, *Philos. Trans., Roy. Soc. Lond.*, 1678, *12*, 1038–1039, fig. 1, tab. 1.

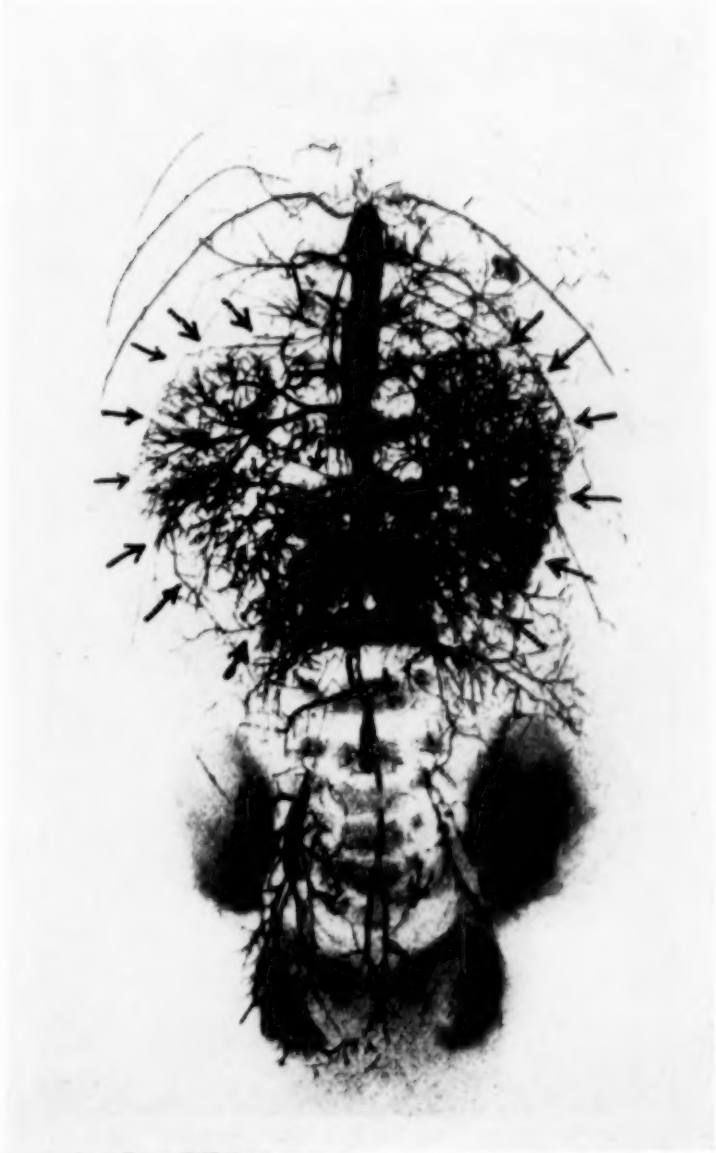


Fig. 11. Arterial tree of horseshoe kidney in a newborn. Reproduced from Anastasia Rubascheva, *Ztschr. urol. Chir.*, 1930, *30*, 253, Abb. 4.

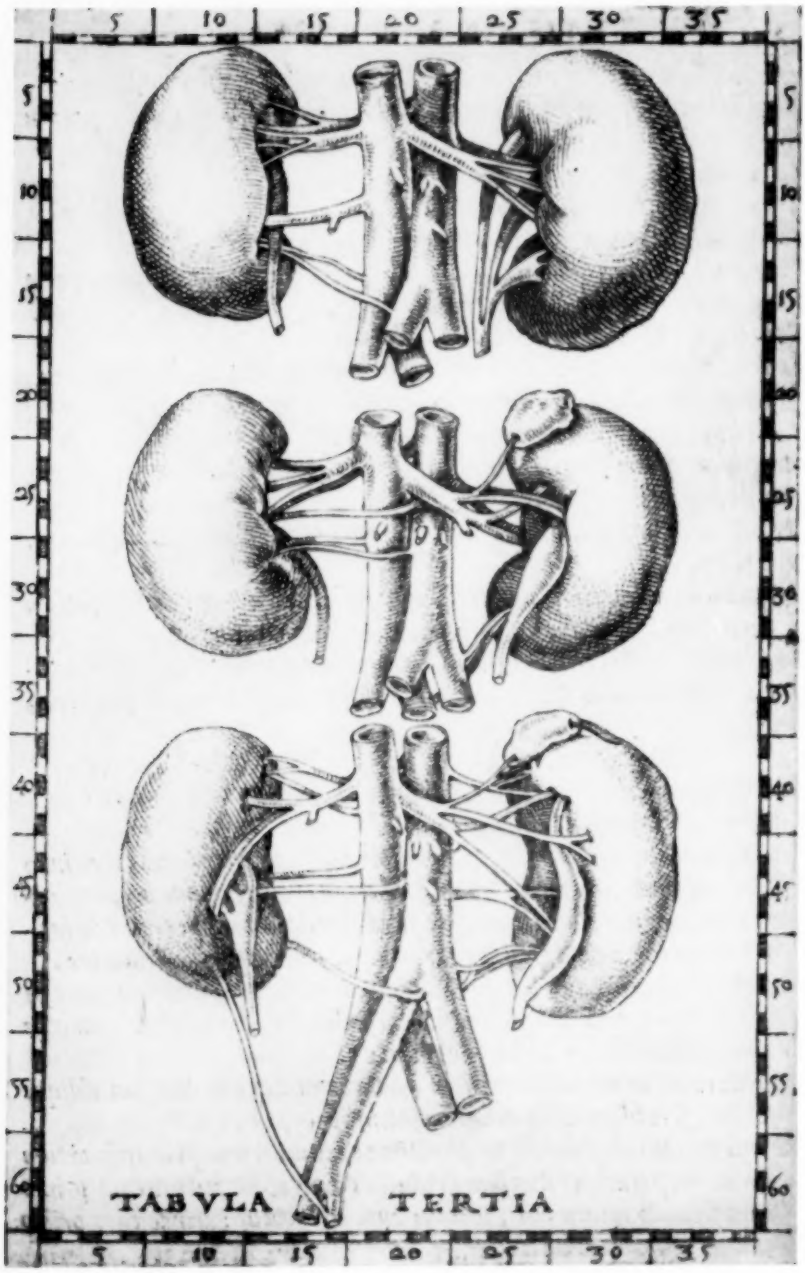


Fig. 12. Right renal artery anomaly from Eustachi, *Opuscula anatomica* (Venice, 1564), f. 9a., Tab. III, bottom figure. Courtesy of the Army Medical Library.

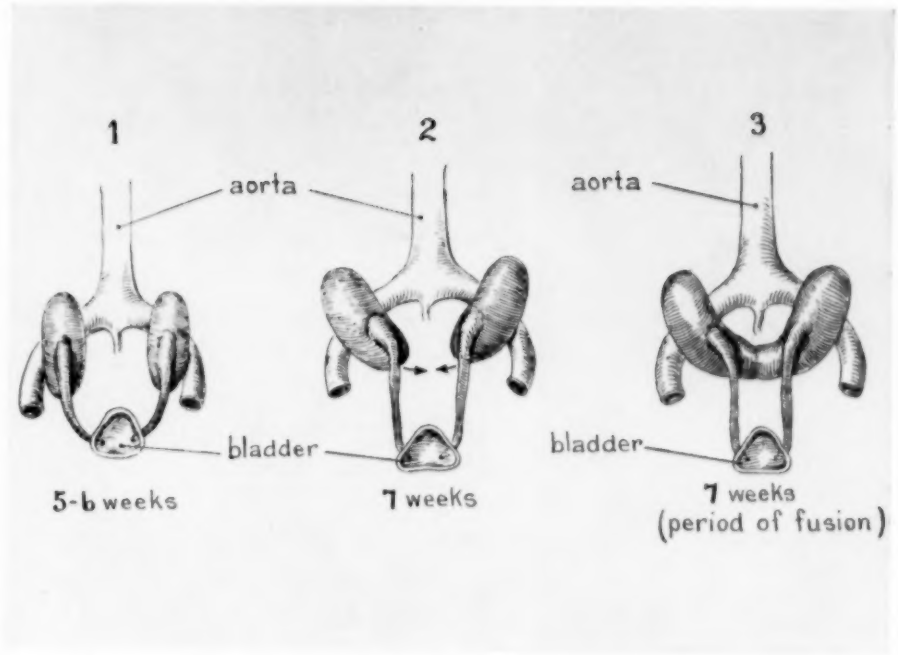


Fig. 13. Diagrammatic illustration of the probable role of blood vessels guiding the kidneys together during their ascensus from the pelvis. Reproduced by permission from Robert Gutierrez, *Amer. J. Surg.*, 1931, *14*, 671, fig. 6.

a

b

c

Fig. 14. *a*. Fused kidneys with horseshoe configuration (upper arrow) and urinary bladder (lower arrow) in a 22-day-old mature rat fetus. The intestines, liver, appendages, and tail have been removed. (Enlarged x3.) Reproduced through the courtesy of James G. Wilson, Ph.D., Department of Anatomy, University of Rochester School of Medicine and Dentistry, Rochester, New York. *b*. Photomicrograph of a transverse section of fused kidneys from a 20-day-old rat fetus. Arrow points medially to the intact renal capsule (hematoxylin and eosin, x24). Courtesy of Dr. Wilson. *c*. Photomicrograph of a transverse section of fused kidneys from a 21-day-old rat fetus, showing continuity of renal parenchyma (hematoxylin and eosin, x24). Courtesy of Dr. Wilson.

Possible mechanisms of embryological development which may account for the horseshoe kidney must therefore be considered. The kidneys are first located in the sacral region and move upward later by a complicated process.[26] If there is a slight medial deviation of the renal primordia sufficient to bring them into contact, then a fused kidney with horseshoe configuration may result, particularly since the kidneys are normally at very close range at one point of their ascensus (Figure 13). According to Keen[27] duplication of the genito-urinary system does not depend upon a median line cleavage of a primitive embryonic layer like the neural tube, or on dichotomy, but is associated with the amount of separation which is achieved by growing cephalic ends and vascular developments. Anson and his co-workers[28] believed that "the connective tissue of organ capsules functions like fascia, separating adjacent structures, and is apparently of greater significance in the mechanics of embryonic development than has hitherto been appreciated."

Such considerations raise the question of the part played by hereditary and non-hereditary factors in the development of the anomaly. The necessity for distinguishing between these two groups of factors will become increasingly evident as research on the subject continues. It is generally accepted now that many gross human malformations are hereditary, arising solely from a germ cell prior to fertilization. For this theory the most convincing single piece of evidence is the frequency with which malformations occur in siblings. So in the anomaly of the horseshoe kidney the hereditary factor may be important. But the influence of certain environmental factors such as maternal pelvic radiations and rubella[29] cannot be excluded in a consideration of maldevelopment. According to Borak[30] and Snell[31] only fertilization occurring during the period between irradiation and temporary sterility is definitely known to produce defective offspring. The diets of the mothers may also bear a share of the responsibility; if they are significantly lacking in adequate amounts of certain minerals and vitamins, defective children will result according to the report of Murphy.[32]

[26] Gruenwald, Peter, "The normal changes in the position of the embryonic kidney," *Anat. Rec.*, 1943, *85*, 163–176.

[27] Keen, J. A., "The anatomy and the embryology of double monsters, with special reference to dicephalus," *South African J. med. Sci.*, 1947, *12*, 117–139.

[28] Anson, Barry J., Pick, James W., and Cauldwell, Earl W., "The anatomy of commoner renal anomalies: ectopic and horseshoe kidneys," *J. Urol.*, 1942, *47*, see footnote 10, p. 125.

[29] Swan, Charles, "Rubella in pregnancy as an etiological factor in congenital malformation, stillbirth, miscarriage and abortion," *J. Obstet. Gynec. British Empire*. 1949, *56*, Pt. 1, p. 360.

[30] Borak, J., "Über neuere Versuche zur Frage: Keimdrüsenbestrahlung und Vererbung," *Arch. Gynäk.*, 1931, *147*, 304–359.

[31] Snell, George D., "Induction by roentgen rays of hereditary changes in mice," *Radiology*, 1941, *36*, 189–196.

[32] Murphy, Douglas P., *Congenital malformations*, Philadelphia, J. B. Lippincott Co., 1947, 2nd ed.

Warkany and Wilson[33] have in their recent work with the rat made important findings concerned with malformation in the genito-urinary tract in the fetus induced by maternal vitamin A deficiency. Of 50 abnormal rat fetuses, they found in 29 fused kidneys with horseshoe configuration (Figures 14a, b, and c).

Much work remains to be done on this type of renal anomaly. Medical science evolves slowly. Botallo four hundred years ago could hardly have foreseen the refinements of investigation to which the malformation which he described so conscientiously would be subjected. None of the refinements to date can minimize the importance of his contribution. The anatomist, the medical historian, and the physician will give due credit not only to him but also to all future investigators who can contribute to our knowledge of the causes which produce fused kidneys with horseshoe configuration.

[33] Warkany, Josef, Roth, Carolyn B., and Wilson, James G., "Multiple congenital malformations: a consideration of etiologic factors," *Pediatrics*, 1941, *1*, 462–471. Wilson, James G. and Warkany, Josef, "Malformations in the genito-urinary tract induced by maternal vitamin A deficiency in the rat," *Amer. J. Anat.*, 1948, *83*, 357–407.

Science Resurrected*

M. ETZIONY†

> Rabbi Meir said, Look not at the flask but at what it contains: There may be a new flask full of old wine, and an old flask that has not even new wine in it.
>
> ETHICS OF THE FATHERS

I

IN preparing this review the present writer had two objects uppermost in mind: first, the general reader's interest in medical history, both from the inspirational as well as from the practical point of view; secondly, the emphasis on the *what* rather than on the *how*, i.e., not only whether the job was well done, but also, and primarily, what does reading of the *Epitome* give us in terms of "book value."

The translation of the *Epitome* of Vesalius into modern English is to be regarded as an important event in the history of medicine, comparable to translations of other classics. For indeed the first and foremost duty of the historian is to salvage and preserve from loss or destruction the various works of the masters, be they manuscripts or incunabula. The second duty is to keep these treasures not merely as mementoes for exhibition purposes on this or that occasion, but rather to make these works of human genius readily accessible to anyone interested in reading the full text of the masters' books. Not having the original text, or its translation—only a "closed book" in the literal sense of the word—resulted in the fact that most of our great forebears' works "have been more often praised than read," as Dr. Lind very aptly puts it. Moreover, one is thus encouraged to have the true, unaltered source from which spring one's inspiration and understanding of man's past heritage. It is for this reason that one welcomes enthusiastically a modern translation of Vesalius' *Epitome*.

It is not our intention, nor is our knowledge of Latin sufficient, to bring under microscopic scrutiny the skill and scholarship of the translator in rendering the original into English. If flaws there be, someone might perhaps be more qualified than the present writer to find them. To those who

* Being a review of the English rendition of the *Epitome* of Vesalius, translated from the Latin with preface and introduction by L. R. Lind, Ph.D., with anatomical notes by C. W. Asling, M.D., Ph.D., and a foreword by the late Logan Clendening, M.D. New York, The Macmillan Co., 1949. Publication No. 21, Historical Library, Yale Medical Library.

† From the Department of Medicine, Jewish General Hospital, Montreal. The writer wishes to express his thanks to Dr. W. W. Francis, Librarian of the Osler Library, McGill University, for reading the manuscript.

are interested in the *significance* of such a "job" from our approach, the task has been accomplished, and creditably.

In rendering a classic, especially a scientific classic, into modern language for the present-day reader, the translator has the choice of two diverse approaches: either literal adherence to the text or too much "modernization" thereof. Dr. Lind has chosen a wise course in that he has been faithful to the original text, and yet has chosen "modern technical phraseology." While this is undoubtedly expedient, the finicky reader of classics may wonder whether it might not have been more illustrative, though less "practical," to leave the archaic nomenclature, and have its modern equivalent bracketed or footnoted.

One can readily see eye to eye with Dr. Clendening, when in his foreword to the *Epitome* he explains why "after careful discussion it was generally agreed . . . to select the Epitome . . ." first. "The Fabrica by its bulk alone condemns itself, except for the hardiest and most curious scholars." Nevertheless, the translation of the *Fabrica* being presently prepared by Saunders and O'Malley is most anxiously awaited by all lovers of the history of medicine.

Dr. Lind's Introduction is very stimulating in itself, particularly his notes on the *Epitome*. It is a concise statement, full of interesting and valuable material. It gives us the main differences between the *Epitome* and the *Fabrica,* aside from mere size and volume, by way of arrangement of material, style, and so on. "The Epitome is a book in its own right, independent in treatment, point of view, and purpose." The translator does not even purport to give a full account of Vesalius and his works, as he himself makes clear. All he intended in his brief introduction was "to convey merely the chief facts about Vesalius and the Epitome." For exhaustive and detailed bibliography Dr. Lind refers us to the outstanding *Bio-bibliography* of Harvey Cushing. Although the bibliography given in Lind's version of the *Epitome* is admittedly "very short" by design, since it contains "a selection of the more important works on Vesalius and his writings," it is a pity that mention of such an important work as *A Prelude to Modern Science* by Singer and Rabin, a very thorough and intensive study of Vesalius' *Tabulae anatomicae sex,* has been omitted. Indeed, this predecessor of the present *Epitome* is a milestone in classical translation and commentary.

The list of marginal notes by Vesalius, being an incomplete series of Greek equivalents for the Latin terms used in his text, lends additional value to the translated volume. A short paragraph at the end of the intro-

duction on the present translation, as compared with the German translation of Albanus Torinus, is also worthy of note.

II

Now, to turn to the *Epitome* itself. Of course the greatest contribution of Vesalius to the advancement of science was his discovery of Galen's errors, and hence the establishment of the unshakable principle that nothing is as true as truth itself, the yearning for it, the courage to insist on it; and once established, it overtowers any belief or tradition, regardless of its prophet. In this he achieved equal footing with Copernicus, Galileo, Harvey, and Darwin. And although history repeats itself, so few seem to learn from it. Need one attest to Vesalius' genius by mentioning that at the age of twenty-eight he completed the *Fabrica,* on which he had been working for almost five years?

However, what is even more intriguing in the life of Vesalius, as one often finds in the lives of many men of genius, is his real humanity. Although our main task in unfolding the life of great men is to bring to the fore the stimulating and exemplary element in their lives, yet it seems that these very qualities shine even brighter and are more fascinating, if we, knowingly or unknowingly, do not fail to see them as living human beings with all their frailties and weaknesses. Then they appear in their *true* character. Thus, for example, one is struck by the various tales associated with Vesalius' pilgrimage to the Holy Land, notably the one related to his jealousy of the rising star of his famous pupil Fallopius. In this connection, too, one will recall the very interesting remarks of Singer in his *Prelude to Modern Science* regarding Vesalius' false pretenses at having an intimate knowledge of Arabic, as revealed in his letter to Florinas. Vesalius also omits names of his contemporaries, and rarely refers even to Galen, and, as Lind remarks, "by a characteristic ironical implication, he manages to give the impression that the 'professors' are wrong." Indeed, genius and character must not be expected to live together, nor must they be taken to be directly or inversely proportional in kind or degree.

And yet, in spite of all these human shortcomings, Vesalius' genius along didactic, linguistic, and thought-provoking lines is obviously outstanding. This is evident throughout the *Epitome,* beginning with his address to the reader (on the frontispiece), in which he outlines the substance of the foregoing work and suggests a method of learning therefrom, down to the last illustrative figure.

"The compendium of the books on the fabric of the human body which I now publish is divided into two sections of which the first is comprised of six chapters embracing a most succinct description of all the parts; the second section displays their delineation in a number of plates accompanied by indices of the characters by which they are designated. Therefore, it is a matter of your own choice and dependent upon your desire. . . ."

No modern teacher could exhibit a more liberal approach towards his pupils in the "how" and "what" to study, and bid them so encouragingly: "Farewell, and use these, my efforts, as frankly as they are offered."

No less fascinating is Vesalius' dedicatory letter to Philip II. Whether his bowing "to the most serene prince" was entirely a matter of convention or a "necessary evil," or an expression of servility on the part of Vesalius, must be left to anyone's guess. This is, however, overshadowed by the unsurpassed sentences of description and scientific fervor and zeal. Says he: "Within the slender compass of these pages . . . there is sent forth unto the common use of learning the description of the human body. . . . This has been done with as much conciseness as possible, and with less labor it describes those matters which I have embraced more amply in my seven books upon the subject. To those books this Epitome is as it were, a footpath, or, as it will also be rightly considered, an appendix, gathering into summary form the chapters which are set forth with detail in those books. . . ." This work has been put forth because it is inconceivable "that in the pursuit of studies so varied, the harmony of the human body . . . should lie constantly concealed; that man should be completely unknown to himself; and that the structure of instruments so divinely created by the Great Artificer of all things should remain *unexamined* [italics mine]: since it is by the *function* of these instruments that those things we look upon as most, and almost solely, important are brought to pass."

Vesalius is not unmindful of the fact that by publishing "this companion to physicians" in order "to be useful to them," he at the same time is "anxious to snatch opportunity from the hands of certain rascally printers" who may later publish someone else's labours "under their own names. . . ."

Vesalius, the great teacher, was as modern then as he would be today when he says: "For no one is ignorant how much is lost in all sciences by the use of compendiums . . . for given to the use of compendiums alone, we read scarcely anything else through to the end these days. This is true even for those who have delivered themselves completely to learning, to this

degree aspiring only to the shadow and superstructure of science, digging little or not at all beneath the surface."

Now the practising physician comes under criticism, in good measure deservedly so: ". . . it is a charge to be laid most gravely at the door of the mob of physicians that they perform their duty so carelessly in distinguishing the parts of the human body that not even enumeration is made use of in learning them . . . how many can be found who know even the number of the bones, cartilages, ligaments, muscles, and veins, arteries, and nerves . . .? I pass over in silence those pestilent doctors . . . who never even stood by at a dissection: whereas *in the knowledge of the body no one could produce anything of value who did not perform dissections with his own hands.* . . . Indeed, those who are now dedicated to the ancient study of medicine . . . are beginning to learn to their satisfaction how little and how feebly men have labored in the field of Anatomy to this day from the times of Galen, *who, although easily chief of the masters, nevertheless did not dissect the human body; and the fact is now evident that he described (not to say imposed upon us) the fabric of the ape's body, although the latter differs from the former in many respects* [italics mine]."

What courage, what revolutionary, uncompromising spirit; what up-to-date and direct method of studying anatomy, the basic science in medicine!

III

The substance of Chapter I of the *Epitome* opens at once with material which, as one may expect, lends itself to a very interesting discussion as to terminology, its old and new usage, its evolution in the limited (i.e., anatomical) as well as conceptual orientation (i.e., humoral theory) in the history of medicine. That is evidenced by the very instructive opening footnote of the translator. To a reader like the present writer, who lacks the erudition of those participating in the discussion reflected in the footnote, the intended meaning which Vesalius attached to "similar or simple" and "dissimilar, or instrumental agencies" was, judging by his examples in the former case, synonymous with the "kind of material going into the making of," and in the latter, "organs," as Vesalius himself concludes his sentence: ". . . and the *remaining organs* [italics mine] of the entire body." However, ignorance is, at least at times, bliss in that it helps us to see things rather simply, often too simply. Thus the present writer may fail to see the difficulty.

The exactness and simplicity of Vesalius' anatomical description compares favourably with a present-day textbook description: "The bones are the hardest and driest parts of the entire body. The cartilages are softer than the bones, but of the parts of the body they are next in hardness to the bones. The whole body is supported by bones and cartilages in combination, and all its parts are attached to and stabilized by them. . . . The bone of the temple has connected to it the cartilage supporting the structure of the ear. In addition it has three processes: first, it bears the mastoid process posteriorly; second, the styloid process, like a bodkin or cock's spur; third, a process which turns anteriorly, is closely joined in the external structure of the orbit of the bone of the upper jaw, and at the level of this junction constitutes the part of the skull which we call the os jugale. . . ." No wonder that "The modern encyclopedias of anatomy follow exactly, chapter for chapter, the order in which Vesalius describes the systems of the body." (General Interpretation, Lind, p. 8.)

Further discussion in the sections, "General Interpretation" and "Notes" (Lind, pp. 8–13) following the first chapter of Vesalius, is illuminating and refreshing to the reader. These sections of commentary follow every chapter of the text and form an indispensable "appendix" to the understanding of the *Epitome.*

The second chapter, "Concerning the Ligaments of the Bones and Cartilages, and the Muscles which are the Instruments of Voluntary Movements," is equally remarkable: "The ligaments, no less than the sinews of the muscles and the organs by means of which the animal spirit is led from the brain, are commonly called nerves." Here "Vesalius follows the old view which confused ligaments and nerves, or regarded the terms as synonymous. The Greek word from which comes our "nerve" originally meant *tendon* or *sinew* hence the confusion . . ." (Lind, Notes, p. 33).

Chapter III is entitled "Concerning the Organs Which Minister to Nutrition by Food and Drink." Here is the way Vesalius introduces this topic: "Since man has been unable to form the substance of an immortal being by means of the genital semen and the menstrual blood (the origins of our generation and of those parts of which we are composed), the great Creator of things has carefully devised that man should live as long as possible and that his species never failing should continue to exist forever. In order that man might attain to the stature for which he was intended and that those elements upon which his innate heat is continually fed might be restored as quickly as possible, he possesses organs which serve to nourish him in many ways."

About Vesalius' notion of physiology, Lind says as follows: "In this and the following chapters the physiology departs sufficiently from modern concepts and is so dispersed through the text that it seems appropriate to bring it together in brief abstracts. To these are joined such remarks of general nature as may refer to the subject and yet find no specific place in the serial notes." Lind then takes up critically, in the light of present-day physiological concepts, Vesalius' discussion of blood and bile, their composition, function, transmission, etc.

"The Heart and the Organs which Minister to its Function" are taken up in Chapter IV. The reader here becomes almost emotionally involved, when he eagerly awaits Vesalius' "verdict" on the circulation of the blood. Alas—the miracle has not happened! Providence has not endowed one genius, perhaps fortunately so, with *all* that was to be revolutionary in medicine. It was left to Harvey to solve the mystery *de motu cordis!*

In Chapter V the subject of the "Brain and the Organs Formed for Furthering its Functions" is taken up. With Chapter VI, "Concerning the Organs which Minister to the Propagation of the Species," we come to "the end of the enumeration of all the parts which occur in the fabric of the human body, as far as possible most briefly and in their completeness set down. . . ."

The translation of the passage on "The names of the External Regions or Parts of the Human Body Visible without Dissection," which seems to be the counterpart of our modern surface anatomy, is placed judiciously by Dr. Lind at the end of the sixth chapter, whereas in the original, Vesalius inserted it, for no apparent good reason, together with the Characterum Index, between the plates.

And so the commentary of General Interpretation and the explanatory notes of Dr. Lind prove to be not only a wealth of necessary information in themselves, but they also attest to the scholarship of Dr. Lind and his fine sense of discrimination between brevity and ample explanation of terms, and well taken criticism of the ideas entertained by Vesalius.

The Greek marginal notes of Vesalius (218 items), translated and arranged by Dr. Lind, in order of the chapters in which they occur, complete the excellent work of the translator.

The original Latin text of the entire *Epitome* and the Plates with their designated indices of the characters are fully reproduced in an admirable fashion and lend even greater value to the volume.

It is curious that the *Epitome* is completely devoid of Hebrew-Aramaic and Arabic elements, while the *Tabulae Sex* has them persistently and the

Fabrica abounds in them in the Characterum Index. The *Epitome* was completed after the *Fabrica,* and one cannot, therefore, contend that Vesalius did not have at the time the Semitic nomenclature at his disposal. One would rather be inclined to have the simple explanatory conjecture that since the *Epitome* was primarily intended to be a practical manual for the student of anatomy, the Hebrew-Aramaic and Arabic elements were not a necessary part thereof.

Certain designations and symbols are misplaced or misapplied in the plates. This happened also in the *Fabrica* and *Tabulae.* Parenthetically, one may recall that the same inconsistency is found in these works regarding the choice of Hebrew-Aramaic and Arabic equivalents, a common thing in the terminology used by Hebrew writers of the Middle Ages. However, all these are a minor, rather attractive fault, as compared with the greatness of the works of Vesalius.

One may perhaps wonder why the present reviewer has dwelt less on the material *per se* than on the manner in which it has been presented. We have, however, deliberately chosen this course, as was expressed at the beginning of this review.

The *Epitome,* as presented by Dr. Lind in English, is a great accomplishment in the direction of making all the medical classics available to the modern physician. Dr. Lind and his co-worker, Dr. Asling, have not only acquitted themselves of their task creditably well, but also thus made an important contribution towards the resurrection of the great masters of medicine and their writings.

Notes and Queries

Medical History in Foreign Publications

Two new journals of medical history have recently appeared. One of these, the *Revista Brasileira de História da Medicina*, is published under the auspices of the Brazilian National Federation of Medical History. The *Revista* is a quarterly and is edited by Ivolino de Vasconcellos, well-known Brazilian medical historian and president of the Brazilian Institute of the History of Medicine.

The first issue of the *Revista* contains an introductory editorial outlining the policy of the journal, a brief note on Hippocrates, three articles by Ivolino de Vasconcellos on "Foundations of the Brazilian Institute of the History of Medicine," by Ordival Gomes on Professor Rocha Vaz, and by Luiz Lamego on "Old Doctors, Old Prescriptions." In addition there are book reviews and notes of medico-historical interest.

The other new journal is *Archivos Iberoamericanos de Historia de la Medicina*. This publication is to appear bi-annually at Madrid under the joint editorship of Pedro Lain Entralgo (Madrid) and Anibal Ruiz Moreno (Buenos Aires). The first number of the *Archivos* contains the following contributions:

Pedro Lain Entralgo: The Hippocratic clinical history.

Juan Antonio Paniagua: The general pathology of Arnald of Villanova.

Carlos del Valle Inclán: The anatomical vocabulary of Bernardino Montaña de Monserrate and of Juan de Valverde.

Luis S. Granjel: The psychology of C. G. Jung in the history of the relations between medicine and religion.

José Janini Cuesta: Sickness and diet of St. Jerome.

Silverio Palafox: The history of medicine in the writings of José de Letamendi.

Carlos del Valle-Inclán: The physicians of Philip V and the resurgence of of anatomy in Spain in the 18th century.

Antonio Castillo de Lucas: Moral proverbs and riddles of natural philosophy, by Dr. Cristóbal Pérez de Herrera.

Alfredo Lapuente Mateos: Literary review meetings at the Royal College of San Carlos.

Pedro Lain Entralgo: Fundamental concepts for a history of anatomy.

Ramón Diaz Mora: Popular medicine in the Sierra de Gata region.

These papers are followed by a number of book reviews.

From Peru there has recently come the *Anales de la Sociedad Peruana de Historia de la Medicina* for the years 1948 and 1949. This publication celebrates the tenth anniversary of the Peruvian Society for Medical History. It contains the following contributions:

J. B. Lastres: Ten years in the work of the Society.

C. E. Paz-Soldan: At the end of the first decade.

Luis A. Eguiguren: Physicians, medicine, surgery and social assistance.

J. B. Lastres: An address of welcome to Dr. Eguiguren.

Jaime Jaramillo-Arango: A critical study of the basic events in the history of cinchona. (This paper is particularly valuable for anyone interested in the history of quinine. For certain readers, however, the English version of Dr. Jaramillo-Arango's paper which appeared in the *Journal of the Linnaean Society, Botany,* [March 1949, *53,* 272–309] may be more accessible.)

A note by the editor on the paper of Dr. Jaramillo-Arango.

Lectures on the History of Medicine, University of Edinburgh

During the summer term 1950, Dr. Douglas Guthrie, Lecturer on the History of Medicine at the University of Edinburgh, delivered a series of lectures under the general title, "A Retrospect of Medicine and Science." They are listed as follows:

Tues., April 18. The Science of Retrospection
Mon., April 24. Primitive Magic and Present-day Belief
Mon., May 1. The Mechanical View of Life
Mon., May 8. The Geographical Factor in History
Mon., May 15. A Survey of British Dentistry, 1685 to 1921
(Lecture by Dr. J. Menzies Campbell, Glasgow)
Wed., May 24. Simple Herbs and Synthetic Remedies
Mon., May 29. The Way of the Investigator
Mon., June 5. Teacher and Student in Medical Education
Mon., June 12. Chemistry from Alchemy to Atoms
Mon., June 19. The Medical Man in Literature
Thurs., June 22. Social Medicine in the Nineteenth Century
(Lecture by Professor R. Shryock, Johns Hopkins University, Baltimore)

During May and June a collection of early herbals and pharmacopoeias has been on view in the University Library.

International Congress of the History of Medicine
Amsterdam, August 14–21, 1950

Section IV of the Sixth Congress for the History of Science coincides with the Twelfth Congress of the Société Internationale d'Histoire de la Médecine, the latter adopting this fusion during its session of 25 June 1949. The president of the Société Internationale has asked Section IV to appoint a co-president, and Dr. Schlichting of Amsterdam was nominated as such. Dr. Schierbeek whom

the Société had nominated during its session of June 1949 could not accept this nomination.

The prospectus announcing the Congress states that up to 15 January 1950 the following papers had been promised:

Dr. A. J. M. Lamers, Den Bosch	*Dionysius van der Sterre as an early tropical hygienist in the West Indies*
Prof. Dr. J. Dankmeijer, Oegstgeest	[*Title will be announced*]
Dr. L. van Loon, The Hague	*Geschiedenis van het gipsverband*
Dr. A. J. M. Lamers, Den Bosch	*Précurseurs dans le domaine des antibiotiques*
Prof. E. Wickersheimer, Schiltigheim, Bas-Rhin	*Organisation et légalisation sanitaires au Royaume franc de Jérusalem 1099–1291*
Prof. M. Mariotti, Ancona	*Histoire de la syphilis*
Prof. Jules Guiart, Lyons	1. *Les précurseurs de Pasteur* 2. *Le folklore préhistorique dans la médecine populaire française*
Prof. Dr. T. Bilikiewicz, Gdansk	*Medical relations between East and West in Poland*
Dr. J. Körbler, Zagreb	*Treatment of cancer in the XVIth century*
Prof. Francisco Oliver Rubio, Zaragoza	*La peste en Zaragoza, la Conredia de S. Come y S. Damian*
Prof. Alexandru Barcacila, Bucarest	*Une exploration d'anatomie humaine au VIII^e siècle à Constantinople*
Dr. Suessmann Munter, Jerusalem	*The earliest translations of Greek medical works in the Orient, particularly the Aphorisms of Hippocrates*
Dr. Joshua Leibowitz, Jerusalem	[*Title to be announced*]
Dr. F. Marti Ibanez, New York	[*Three papers to be specified later*]
Dr. P. Delaunay, Le Mans (Sarthe)	*Les relations scientifiques franco-européennes sous la Révolution et l'Empire, en particulier dans le domaine médical*
Dr. E. Goldschmidt, Lausanne	*Les frères Bell et J. Bleuland*
Prof. Ivolino de Vasconcellos, Rio de Janeiro	1. *Ramazzini, O Pai de medicina do Trabalho* 2. *Oswaldo Cruz, Vida e Obra*
Dr. Jakob Seide, Haifa	*Tobia Hacohen of Constantinople (1652–1729) and his medical work*

Over and above the two themes set by the Lausanne Congress, the Comité permanent of the Société Internationale d'Histoire de la Médecine proposes:

a) History of medical iconography,
b) History of medical folklore.

The organizing committee of Section IV proposes:

a) History of syphilis,
b) History of food and nutrition.

Postscript to the translation of Steno's 'On the Passage of Yolk into the Intestines of the Chick'

In Nicolaus Steno's *De vitelli in intestina pulli transitu,* my translation of which you have just published in this *Journal* (1950, 5, 119–143), Steno says (see p. 131): "There are stories of many sick persons who have prolonged life for some days by odors alone. . . ." My footnote (36) comments: "I have not been able to find any source for these stories," and goes on to cite some pertinent passages from Hippocrates and Galen. Within the last few days I have found by chance one of the missing sources. In the *De his, qui diu vivunt sine alimento* of Licetus (Patavii, apud Petrum Bertellium, 1612), book II, p. 50, col. 2, there is the statement that Democritus at the point of death prolonged his life for three or four days by inhaling the odors of honey and freshly baked bread, and that Homer is supposed to have done the same thing by smelling of apples! The Democritus story I have traced back to Diogenes Laertius, p. 394 of C. D. Yonge's translation.

MARGARET T. MAY

Book Reviews

CONWAY ZIRKLE. *Death of a Science in Russia.* Philadelphia, University of Pennsylvania Press, 1949. 319 pp. $3.75.

JULIAN HUXLEY. *Heredity, East and West.* New York, Henry Schuman, 1949. 246 pp. $3.00.

EVENTS unprecedented in recorded history took place in the USSR between 1936 and 1948: a branch of basic scientific knowledge was declared invalid by a decree of the government; some of the exponents of this knowledge were destroyed, imprisoned, or exiled; others were forced to make recantations of their scientific views; still others were prevented by dismissals and the closing of laboratories from pursuing their work. The science involved is genetics with its practical applications in agriculture and medicine.

To those unfamiliar with the Russian scientific scene these singular happenings defy comprehension. Professor C. Zirkle of the University of Pennsylvania has performed a great service to science by assembling and publishing some of the documents bearing on the tragedy, many of which were available only in Russian or only in publications generally difficult of access. Dr. J. Huxley, one of the few foreign biologists who had the opportunity of visiting the USSR repeatedly and of meeting some of the protagonists of the tragedy, has contributed a vivid as well as judicious description and appraisal of the events and the issues involved. To be sure, some relevant facts still remain unknown outside the USSR. The historical roots of the mistrust of genetics on the part of the present rulers of that country go back to a period much earlier than the assault on genetics spearheaded by Lysenko, and a full study of these roots is yet to be made. Nevertheless, the two books under review, especially when taken in conjunction with one another, will enable anyone interested to form a reasoned opinion about the Lysenko affair.

What took place in the USSR does not resemble a legitimate conflict of two opposed scientific schools. It was a clash of knowledge with ignorance. The so-called "genetics controversy" resembles in this respect only the assault on biology made by anti-evolutionists, which culminated in the notorious "monkey trial." One of the first things which Lysenko's "new biology" lacks is novelty. It is a concoction of notions which were current in scientific biology in Darwin's day and up to about the end of the past century. To be specific, these notions are borrowed from Herbert Spencer as popularized in Russia in the excellent books of the venerable Darwinist and plant physiologist, Timiriazev. Whether Lysenko himself is aware of the real age and actual authorship of his "theories" is difficult to tell. Professor Zirkle is inclined to think that Lysenko is "out of his depth," but that some of his coterie, particularly Present and Mitin, are not deceiving

themselves. This is obviously difficult to prove, but it is a fact that up to about 1945 Lysenko and his partisans cited Timiriazev much more often than they do now. In recent writings Lysenko, with commendable modesty, ascribes the discovery of his "theories" to Ivan Michurin, a horticulturist who died in 1935 at an advanced age. One suspects that Michurin, a purely home-grown product, appeals to Lysenko much more than the cosmopolitan and aristocratic Timiriazev.

There was no shortage in the USSR of people who were under no illusions regarding the scientific value of "Michurinist biology." Lysenko and several of his more naïve followers complained that his "theories" were opposed by the Faculty of Biology of the Moscow University and in many other scientific centers of the USSR. How was Lysenko able to master this opposition? The method is clearly delineated in the documents published by Zirkle. With an impeccable sense of timing, Lysenko opened his "concluding remarks" at the meeting of the Lenin Agricultural Academy, on August 7, 1948, by the following terse statement: "The Central Committee of the Party has examined my report and approved it." Except for those who were ready for martyrdom, this ended all opposition. The following phrase of Zhebrak, an erstwhile opponent of Lysenko, speaks volumes: "Now, however, since it has become clear to me that the fundamental aspects of Michurin's direction in Soviet genetics are approved by the Central Committee of the All-Union Communist Party (Bolsheviks), then I, as a member of the Party, do not consider it possible for me to retain those views which are recognized as erroneous by the Central Committee of our Party."

On the "scientific" plane, Lysenko's arguments are two-fold. Firstly, he ascribes to geneticists absurd views which they never held or views which were held years ago when genetics was in its infancy and which are no longer held by geneticists. Secondly, Lysenko claims to have made important discoveries without ever presenting evidence for his claims that would permit their critical evaluation. An example of the first is the repeated assertion that geneticists postulate fixity of the hereditary materials. An example of the second is the assertion that by means of "vernalization" he has transformed winter wheat varieties into spring varieties. An even more sensational claim is that by similar means the hard wheat species (*Triticum durum*) has been transformed into the soft wheat species (*Triticum vulgare*). This is exactly like claiming that by keeping a pussy cat in a warm place one can make her produce a lion cub. Whoever can believe this can believe anything. In short, not a single one of the many "discoveries" claimed by "Michurinists" has been confirmed outside of the territory in which Lysenko wields a power of coercion.

The problem is thus brought to a sharp focus: why have the rulers of the USSR chosen to support Lysenko and to outlaw genetics and geneticists? In default of an indication from this group of people, we are reduced to guesswork. The obvious danger is that one yields to the temptation of inventing a seem-

ingly rational explanation for an occurrence which is altogether irrational. The explanation that the theoretical science of genetics has been sacrificed in gratitude for Lysenko's usefulness in practical agriculture is a product of just this temptation. It is a moot point just how useful might have been Lysenko's activities as agricultural organizer and propagandist. His claims are tremendous but whether they are any more reliable than his alleged scientific "discoveries" is not known. However this may be, a single word from the highest authority would have sufficed to make Lysenko confine his efforts to agricultural administration and leave genetics to geneticists. No less naïve is the hypothesis that genetics was wrecked because Nazis and racialists used genetics to give a veneer of respectability to their prejudices. Unfortunately, it is true that some geneticists have prostituted their science to racialists, even as a few others now prostitute it to Lysenkoists. But surely no method of combating genetical racialists could be more effective than to have more competent geneticists expose the racialist absurdities. The present ultra-patriotic and xenophobic trend in the USSR has favored a theory allegedly invented by such strictly native celebrities as Michurin and Lysenko and militated against a science the foundations of which were laid abroad. The propaganda machine has done its utmost to flatter the local pride in this connection. There can be no doubt, however, that the political authorities would not have endorsed Lysenkoism if they had been even dimly aware of the magnitude of the error which they committed by so doing. Not only have they brought upon themselves the ridicule of the whole scientific world but, more important still, the substitution of science by quackery in the direction of their agriculture will cost them untold losses in harvests for years to come.

Strange as it may seem, those who gave Lysenko his power really believe that they support an innovator against the opposition of conservatives. They were misled by Lysenko and the careerists around him. The careerists were successful because there existed in Russia an accumulated store of prejudice against genetics. The Soviet rulers knew little or nothing about genetics but the word "genetics" evoked unpleasant associations. They heard that Michurin and Timiriazev thought that genetics was bad. "Darwinism," "dialectics," and some other words often mentioned by Lysenko are emotionally loaded, carrying as they do the approval not only of Michurin and Timiriazev but also of Lenin, Marx, Engels, and other authorities. To clinch the argument, Hitler said that genetics supported him; hence, genetics is an enemy. In the last analysis, genetics was destroyed in the USSR because in a totalitarian state the government arrogates to itself the power of settling all issues, including those arising in science, art, and philosophy.

Genetics in the USSR is no more; the problem there is settled for the time being. The repercussions outside the USSR of Lysenko's meteoric career are, however, not a closed chapter. Both Zirkle's and Huxley's books contain some

materials bearing on foreign reactions to Lysenkoism. If Lysenko were an Australian, a Frenchman, or, for that matter, an American, his "theories" would have caused some scornful surprise among a few specialists, and the public at large would never have heard of them. But anything coming out of the USSR is now fuel for passions, hence possibly more people the world over now know the name of Lysenko than that of any other biologist. Then, too, there is the melancholy sight of those few eminent biologists in England and France whose political bias proved so strong that they saw fit to utter, in defense of Lysenko, statements which they knew to be untruths. Also, there is the ludicrous spectacle of apparently well-meaning people who know no genetics and nevertheless argue that Lysenko is a great scientist. Finally, there exist some biologists who in the heat of the polemics against Lysenko made gratuitous assertions which in the last analysis rebound in his favor. Here belong the allegations that Michurin was an impostor and that the Lysenko affair is a part of some sinister communist plot. Michurin was doubtless ignorant but honest, and the endorsement of Lysenko by the Party was an egregious blunder and not a sinister scheme. The two books under review will not be useful to those whose opinions about the merits of the Lysenko case are settled, but they are invaluable for those who wish to know the facts.

Columbia University TH. DOBZHANSKY

MORRIS R. COHEN and I. E. DRABKIN. *A Source Book in Greek Science.* New York, McGraw-Hill Book Company, Inc., 1948. xxi + 579 pp. $9.00.

DE LACY O'LEARY. *How Greek Science Passed to the Arabs.* London, Routledge & Kegan Paul, Ltd., 1949. vi + 196 pp. 15/-.

IN his autobiography, *A Dreamer's Journey,* Morris Cohen relates that "years of teaching courses at City College on the philosophy of science had underlined my conviction that the understanding of science and of what we like to call the modern mind demands an appreciation of the Hellenic spirit of rational inquiry. As against the caricature of science drawn by the irrationalists—the notion that the Greeks were mere speculators, that medieval thinkers were all sunk in theology and superstition, and that science began in the sixteenth or seventeenth century —I had a driving desire to trace the unending adventures of the human mind from Pythagoras to Einstein which are at the source of all enduring achievements in the history of Western civilization. . . . But just as I was coming to realize how far beyond my powers such a tracing of the development of science from its Greek beginnings would be, I found myself drawn into a cooperative enterprise which offered greater promise of success."

This was the preparation of a series of historical source books in the sciences sponsored by the American Philosophical Association. Cohen became one of the editors of the series, and eventually undertook, in collaboration with his former

student, I. E. Drabkin, to prepare a *Source Book in Greek Science*. By the fall of 1941 the book was ready, but then came the war and with it a publisher's decision that such a book would contribute neither to morale nor to the prosecution of the war. Unfortunately, Professor Cohen never saw the volume in print, for he died on January 28, 1947, shortly after the manuscript was made ready for the press.

There is no doubt that the *Source Book* accomplishes in considerable measure the task that Professor Cohen had originally envisaged. This volume makes available to students some of the most significant passages from the Greek writings on science that have been transmitted to us, as well as contributions from Latin literature that reflect Greek thought. These passages are intended to illustrate the history of mathematics, astronomy, physics, chemistry, geology and meteorology, geography, biology, medicine, and physiological psychology. Realizing that passages abstracted from their context have to be evaluated, the authors provided introductory comments and explanatory notes. To render the volume still more useful, there is a list of important publications on Greek science, an index of names, and a detailed table of contents. Unless otherwise indicated, the translations are by Dr. Drabkin.

By providing an excellent medium through which students and other non-specialist readers may obtain a meaningful picture of Greek achievement in science, Cohen and Drabkin have made an important contribution to the history of science.

The corpus of Greek science would have had little relevance for us had it not been transmitted to the Western world by the Arabs. This process of transmission itself forms one of the most fascinating chapters in the history of science and medicine. Dr. O'Leary's book is an endeavor to tell this story. The direct transmission of the Greek legacy began early in the ninth century, but indirectly the Arabs had already obtained a knowledge of Greek science through the Asiatic world, chiefly through Syria, Persia, and India. O'Leary describes the vigorous development of Greek science by members of the Oriental Christian churches such as the Nestorian and the Monophysite, and shows how they eventually emerged as teachers of the Moslems.

The book is marred somewhat by repetitiousness and occasional typographical errors. Thus on page 49, Ephraem, head of the school of Nisibis, is reported to have died in 375, but two pages further on (page 51) it is said that his death took place in 373. Also, O'Leary is inclined to make dogmatic statements that are certainly not borne out by the available evidence. On page 41, he states that the first persecution of Christians in Rome under Nero was instigated by Jews. Probably this statement is made on the basis of H. B. Workman's *Persecution in the Early Church*, 1906. Close examination shows, however, that such charges have generally been made on very fragmentary and flimsy evidence, and Dr. O'Leary does not even undertake to substantiate his assertion. Similarly, to say

that in the Jewish academies of Sura and Pumbadita interest was concentrated in law and ritual observance is to be wide of the mark. Dr. O'Leary need only have consulted Jacob Obermeyer's *Die Landschaft Babylonien* (1929) or J. Newman's *The Agricultural Life of the Jews in Babylonia* (1932) to discover that the scholars at these academies were interested in practically all aspects of the society in which they lived.

Aside from these minor criticisms, O'Leary's book provides a necessary link in the literature on Greek science.

GEORGE ROSEN

PAUL H. OEHSER. *Sons of Science; the Story of the Smithsonian Institution and Its Leaders.* New York, Henry Schuman, 1949. xvii + 220 pp., 39 illus. $4.00.

As the books in *The Life of Science Library* come off the press, Americans will pause especially over *Sons of Science.* The Smithsonian Institution is an important part of our national heritage, and while its story has been ably chronicled elsewhere in the nearly two thousand pages of *Documents* compiled by William J. Rhees, in *The Smithsonian Institution, 1846–1896,* edited by George B. Goode, in Webster P. True's *The First Hundred Years of the Smithsonian Institution* (1946), and in many other places, there is still very definitely room for another work on the subject. It is to be hoped that Mr. Oehser's little volume will reach a wide public, particularly of young Americans.

The task of telling the story of a century of the Smithsonian within short compass is one obviously requiring considerable compression and selection. The opening chapters describe the career and bequest of James Smithson. Entertainingly related is the long struggle in Congress over what to do and what not to do with the half-million dollars left to the United States "for the increase and diffusion of knowledge." Perhaps the rôle of John Quincy Adams could be stressed a bit more than it is. The remaining chapters are built around the administrations of the secretaries of the Smithsonian from Joseph Henry, the first secretary, to Alexander Wetmore, the present secretary. Henry had to sidetrack his own brilliant researches in electricity to build the Smithsonian into a research institution. Spencer F. Baird developed the National Museum. Samuel P. Langley pioneered in astrophysics and aeronautics. Charles D. Walcott, geologist, faced thorny administrative problems arising out of the first World War. Charles G. Abbot made basic studies in radiation and organized a world-wide network for solar research. Secretary Alexander Wetmore, ornithologist, has dealt with a host of scientific research activities arising out of World War II and the postwar scientific problems of the government.

The march of science, administrative history, and biographical anecdote all had to be fused to produce the story of the Smithsonian. That task of blending has been done by one who knows the Smithsonian from long affiliation with it

(he has been editor for the Smithsonian's United States Museum since 1931, and since 1946, Assistant Chief of the Smithsonian's Editorial Division as well).

The principal defect of the book is the high degree of compression necessary to make the work short and popular. On p. 116 "the moon of Mars" should, it would seem, read "the moons of Mars." The bibliography is excellent. Altogether the book represents an important contribution to the growing literature on the history of our national scientific organizations. It is to be hoped that someone will do a comparable job on the history of the National Academy of Sciences and the National Research Council.

Findlay College RALPH S. BATES

I. HARVEY FLACK. *Lawson Tait, 1845–1899.* London, Messrs. William Heinemann, 1949. vi + 148 pp. Illus. 17s. 6d.

THIS book is an expanded version of the Thomas Vicary Lecture delivered in 1947 and provides an excellent reassessment of the work of Lawson Tait, a pioneer in gynecology. Stewart McKay's biography of Tait is not readily available and moreover contains too much hero worship.

Tait deserves to be remembered, for in spite of the fact that he was often wrong-headed, he was a great surgeon who made fundamental contributions to the art. He did his first ovariotomy in 1868 and removed an abscessed ovary in 1872. Along with Sims he was a pioneer in the surgery of the gall bladder, popularizing the operation of cholecystotomy. The story of his operation for ruptured ectopic gestation is a dramatic chapter in the history of surgery; Tait's patient was the first to survive operation for this death-dealing condition.

Tait was very popular in the United States which he visited in 1884. At home, however, he was looked upon either as a blackguard or a saint; one could not be neutral about Tait. His faults were grave ones, but he was capable of learning from his own mistakes, an essential trait for a good surgeon.

The tiresome myth of Tait's parentage has been successfully dealt with by the author.

This is an attractive little book, except for the quality of the paper. The illustrations are good. It is just the kind of book to put in the way of young house surgeons, for it ought to stimulate interest in the history of our profession.

New York, N.Y. CLAUDE HEATON

ALEXANDER MITSCHERLICH and FRED MIELKE. *Doctors of Infamy: The Story of the Nazi Medical Crimes.* Translated by Heinz Norden. With Statements by Three American Authorities Identified with the Nuremberg Medical Trial: Andrew C. Ivy, M.D., Telford Taylor, Brigadier General U.S. Army,

Leo Alexander, M.D.; and a note on Medical Ethics by Albert Deutsch (including the New Hippocratic Oath of the World Medical Association). New York, Henry Schuman, 1949. xxxix + 172 + xiii pp. Illus. $3.00.

Doctors of Infamy is an exposition of the Nazi criminal activities conducted under medical auspices. Three prevalent misconceptions about these medical crimes are refuted by the material presented here. The belief that the Nazi medical crimes were simply a form of rationalized sadism is not borne out. Although some sadists were certainly involved in these activities, Nazi Germany offered ample opportunity for Nazi officials in concentration camps to gratify sadistic impulses without complex rationalizations. Any idea that the experiments and extermination programs were forms of terrorism analogous to the tortures of the Inquisition is also dispelled because the record makes clear that great secrecy surrounded the activities and no hint is made of information or confessions wrung from victims by such methods. For this purpose the Nazis had more efficient and less elaborate devices. General Taylor's interesting analysis of medical experiments with human subjects makes it clear that the criminality of Nazi medical activities does not arise simply from the fact that experiments were performed on human subjects. Since this tale of human degeneracy does not deal with rationalized sadism or inquisition-like tortures, it is necessary to examine the events as part of medical activity during the Nazi period of German history.

Frederick the Second of Sicily amazed the world of his time in many ways. One of his amazing deeds was to begin the modern history of governmental medical research. It is said that one experiment was designed to discover the optimal conditions for digestion. He had two knights eat large meals, sent one hunting and the other to bed, and after a period had their stomachs opened and the state of the digestion observed.[1]

Seven centuries later Hitler and Himmler and the Nazi government of Germany ordered the performance of a series of experiments on human subjects who were prisoners of the state. These experimenters were tried at Nuremberg and some of them were sentenced. Their activities are recorded in this book as an elaboration of a criminal indictment. Frederick became known as *stupor mundi,* wonder of the world; the authors of this book correctly dub Himmler's experimenters *Doctors of Infamy.*

The heart of the book consists of a translation of the publication written for the information of the German medical profession and the German public. It reveals the reality of the experiments and the extermination programs carried out under medical auspices during the period of Nazi power. It is, of course, not a complete record of the infamous medical practices carried out by German physicians during the Nazi régime. Nor does it give enough information to evaluate

[1] This story has several versions which do not differ in essentials. One can be found in Ernst Kantorowicz, *Kaiser Friedrich der Zweite.* Fourth Edition. Berlin, Georg Bondi, 1936, p. 330.

completely the scientific value of the experiments. Appended to this record are several statements of varying interest, including one by the publisher of the American edition.

Each research problem tackled by scientists deals with an ambiguous situation in nature. The way in which scientists picture this ambiguous situation—that is, the problems they select and the way they design their experiments—can provide us with valuable cues to their way of thinking and attitudes. The design of an experiment corresponds in some ways to the response of an individual to the projective tests used in psychiatry. The Rorschach test with its inkblots and the Thematic Aperception Test with its ambiguous pictures reveal an individual's ways of thinking and attitudes by requiring an imaginative interpretation of the stimulus situation. In the same manner the problems scientists see in nature reveal their viewpoints and values. If this is true, then the ways of medical research in a given period should be especially illuminating regarding a society's attitude toward people and toward life.

Approached from this point of view, the activities of the Doctors of Infamy reveal several interesting features. Each experiment is designed to discover the minimal conditions for functional survival of humans. This is particularly clear in the experiments designed to study the result of immersion in very cold water. The same may be said of the investigations conducted under low atmospheric pressures and those in which the subjects drank sea water as their source of fluid. The striking thing about all these experiments is their emphasis on death. Their purpose is to see how close to death a man may be and still function, presumably as a *Luftwaffe pilot*. The attitude towards life expressed in these experiments is as far as possible from the attitude of Frederick's digestion experiments. One is designed to find the minimal conditions for fulfilling a certain function; the other was designed to find the optimal conditions for a physiological function. One expresses the death of human values, the other their birth.

This contrast becomes sharper when one considers what experiments the Nazis might have carried out in view of their absolute control over the lives of the individuals they used in their experiments. Could they have provided their subjects with optimal conditions for life—the best of housing, food and clothing, the most encouraging psychological perspective for a secure and productive future—and then observed the subject's reactions to diseases and the other hazards of life? It was not lack of material resources or control over individual destinies which made such experiments impossible for them; it was the nature of fascism itself.

The experiments in heterologous bone grafting show a further development of the same attitude. In these experiments large bones and parts of bones were removed from prisoners and transplanted in injured German personnel. The thinking behind such experiments is reminiscent of the concept of replaceable parts developed for guns and machines by Eli Whitney in the city where this

review is being written. The development of techniques whereby the healthy furnish blood to the sick affords a contrast in attitudes. While blood transfusions involve a social sharing of living matter, the heterologous bone graft requires the permanent destruction of the donor. The principle when applied to motor vehicles and guns was aptly called "cannibalisation" by our army personnel. But the doctrine of replaceable parts reduces the cannibal as well as the cannibalised to the status of a machine.

The record shows that this attitude toward humanity was not confined to the "racially inferior stocks" on which many of the experiments were carried out. The medical researches conducted by the Nazis show that the German people were also viewed as instruments to be preserved when useful, and eliminated when no longer serving their assigned functions. This is clearly shown in the programs for the extermination of the mentally defective, the mentally ill, the hopelessly tubercular, and the crippled. This program also included the extermination of wounded war veterans when hopelessly crippled. The Nazis did not even consider themselves beyond this method of evaluation. SS physicians developed special methods for exterminating SS officials who no longer served their purpose by injections of phenol, gasoline, and tuberculosis bacillus cultures.

Although the German Nazis developed their theories regarding "racially inferior stocks," they did not hesitate to consider experiments conducted on other "races" as relevant to their own health.[2] The heterologous bone grafting experiment reveals more confusion regarding racial differences than did the policies of the American Red Cross regarding blood transfusions.

The lessons learned from the trials by the various commentators are of special interest. They are unanimous in considering the destinies of the prisoners at the trial relatively unimportant. They all seek to understand how such things came to be and what must be avoided in the future to prevent a similar piece of degeneracy. Dr. Ivy of the American Medical Association learned among other things that "acceptance or even silence before antisemitism and the trappings of racism . . . can lead to dishonor and crime in which the entire medical profession of a country must in the last analysis be considered an accomplice." He has also learned that the introduction of national health insurance is very likely to lead to such criminal acts and attitudes on the part of the medical profession.[3] General Taylor cites ten valuable principles developed by the tribunal to deter-

[2] An interesting sidelight on this appears on page 32 of the book which gives an account by a technician of "the worst experiment ever made": "... Two Russian officers were brought in from the prison barracks. They arrived about four o'clock in the afternoon. Rascher had them stripped, and they had to go into the vat naked. Immersion in very cold water experiments. Hour after hour went by, and whereas usually unconsciousness from the cold set in after sixty minutes at the latest, the two men in this case responded fully after two-and-a-half hours. All appeals to Rascher to put them to sleep by injection were fruitless. About the third hour one of the Russians said to the other: "Comrade, please tell the officer to shoot us." The other replied that he expected no mercy from the Fascist dog. Thereupon the two shook hands with a "Farewell, Comrade." ... The tests lasted at least five hours before death supervened."

[3] Ivy, A. C. Nazi war crimes of a medical nature. *J. Amer. Med. Ass.*, 1949, *139*, 131.

mine the justifiability of experiments on human subjects. Dr. Alexander learned that the Nazis used methods similar to those developed by criminal gangsters for testing the loyalty of doubtful members and simultaneously binding them closer to the gang. Albert Deutsch claims that the New Hippocratic Oath of the World Medical Association can be considered a great positive reaction to the record of the Nazi medical crimes. However, it should be noted that the New Hippocratic Oath contains the pledge "The health and life of my patient will be my first consideration" and is similar to its predecessor in omitting all reference to medical research.

It is the opinion of this reviewer that these efforts to learn the lessons which must be learned from this episode of history fail to meet the issue raised. They tend to hold up as the alternative to dehumanized Nazi medicine and medical research the alternative of the mythical independent physician responsible to no one but his patient and his own conscience. We should know by now that no man is an island unto himself; nor can a doctor and his patient together with his disease make up an island governed by the Geneva version of the Hippocratic Oath.

The ethical problems of medical practice and medical research cannot be solved by retreating to the socially isolationist concept of medicine. They can only be solved by moving forward toward a positive concept of medicine as a social science serving social man in his struggle to achieve the highest possible standards of health and personal development. Perhaps it is these goals which Dr. Mitscherlich is striving to express in the following portion of the passage in which he states his evaluation and to which the publisher of the book draws special attention:

"There is not much difference whether a human being is looked on as a 'case,' or as a number to be tattooed on the arm. There are but two aspects of the faceless approach of an age without mercy. . . . A profound inhumanity had long been presaged. This is the alchemy of the modern age, the transmogrification of subject into object, of man into a thing. . . ."

New Haven, Conn. ERNEST M. GRUENBERG

GEORGE SCHWAB. *Tribes of the Liberian Hinterland.* Edited, with additional material, by George W. Harley. (Papers of the Peabody Museum of American Archeology and Ethnology, Harvard University, Vol. XXXI.) Cambridge, Mass., 1947. xix + 526 pp., 83 collotypes and 29 illus. Map. $7.50.

MR. SCHWAB, who with his wife in 1928 made this survey of little-known Liberian tribes for the Peabody Museum, had had more than thirty years of missionary experience in Cameroun. His editor, Dr. G. W. Harley, author of *African Medicine,* one of the best existing books on primitive medicine, has spent almost the same amount of time as a medical missionary among the Manos of Liberia. It is therefore not surprising that the monograph under review is a rich storehouse of all kinds of information on Liberian ethnology (technology, social organisa-

tion, religion, art, law), native medicine and disease prevalence not excluded. Much is added to Dr. Harley's above-mentioned classic. The author explains a number of character traits of Liberians by the prevalence of chronic diseases like yaws, malaria, hookworm, and chronic underfeeding. The latter seems to be caused largely by the "civilising" activities of a central government at the coast. Some of the influences of this government, like the abolition of cannibalism, have also been beneficial. Technically it is regrettable that the author obtained much of his information in Pidgin English which, by referring to native gods as "devils" or the uterus as "stomach" often creates a somewhat lopsided picture of the native cultures. In spite of such shortcomings this is a superb treatise, lavishly provided with excellent maps and illustrations.

Madison, Wisconsin ERWIN H. ACKERKNECHT

I. H. RUBENSTEIN. *A Treatise on Contemporary Religious Jurisprudence.* Chicago, Waldain Press, 1948. 120 pp. $2.50.

THIS little treatise with the forbidding title, written by a member of the Illinois bar, offers much that is of great interest to the medical man and the medical historian. It deals with three complexes: fortune telling, faith healing, and (religious) pacifism. Fortune telling and faith healing are still widely practised, and often combined by the same irregular practitioners, or members of certain sects.

On all three subjects the author gives short historical notes leading to the development of the present legal situation and proceeds then to describe the possible criminal and civil implications of the respective practice. Numerous casuistic illustrations and references to court rulings are given. Most of the difficulties seem to arise in connection with Christian Scientists. To the medical historian it is interesting to observe how the retention of "normal" medieval attitudes brings people into conflict with laws of a society that is now oriented towards science. Withholding medical treatment from a child for religious reasons might lead to condemnation for criminal neglect and manslaughter. The faith healing cases quoted e.g. under "Use of the mails to defraud" constitute a remarkable catalogue of madness and roguery. State laws vary greatly, of course, in stringency and coverage.

Madison, Wisconsin ERWIN H. ACKERKNECHT

PAGE COOPER. *The Bellevue Story.* New York, Thomas Y. Crowell Company, 1948. x + 277 pp. $3.00.

THIS is probably the most interesting account of New York's famous old hospital to appear to date. It is told in an interesting and dignified manner and it contains original material of definite value to the medical historian.

The question of which hospital in the United States is the oldest one has long been a subject of controversy. In this reviewer's opinion the oldest hospital still in existence is the Philadelphia General. Bellevue cannot claim to have originated in 1658 when the old Dutch Hospital was founded, for when this was torn down nothing took its place. The present Bellevue Hospital grew out of the almshouse, established in 1736 when municipal hospital care may be said to have started in New York City. Charity Hospital in New Orleans was started the same year. It can be truthfully said that Bellevue Hospital is the oldest still in existence in New York City.

Bellevue Hospital was the first in America to establish a training school for nurses patterned after the Nightingale school. It was the first hospital to establish an ambulance service. It had the first lying-in ward in New York City. Chapters on the tuberculosis service, established by the late Dr. James Alexander Miller, and on the psychiatric division contain considerable new and valuable material.

More careful proofreading would have eliminated such irritating minor mistakes as "clavian artery" and "bronchocephalic artery." There is an index but no bibliography. There are no illustrations. *The Bellevue Story* is a very worthwhile book.

New York, N.Y. CLAUDE HEATON

DOROTHY STIMSON. *Scientists and Amateurs: A History of the Royal Society.* New York, Henry Schuman, 1948. xiii + 270 pp., 20 illus. $4.00.

THIS volume in the "Life of Science Library" is more successful than some of its predecessors in performing the difficult task of presenting the history of science authoritatively and accurately and at the same time in a manner designed to capture the interest of that convenient fiction the "general reader." The author has the advantage, it is true, of not having to present a large mass of highly technical information in a form that will be intelligible and attractive to readers untrained in science. Nevertheless, she wisely assumes her "general reader" is an educated person, with at least the scientific and historical knowledge expected of students in a liberal arts college, and she therefore refuses to "talk down" to him. She avoids, furthermore, the cardinal sin of popularizers of sacrificing scholarly accuracy for the sake of rhetorical emphasis.

Professor Stimson is specially qualified to write a "biography" of the Royal Society. On the one hand, her scholarly publications have contributed greatly to our knowledge of its early history; on the other, her skill in awakening an interest in the history of science among liberal arts students is attested by the remarkable success of the course she has given for many years at Goucher College on "The History of Scientific Ideas." In *Scientists and Amateurs,* which she dedi-

cates to the students in this course, she draws upon her talent for lively and lucid exposition to present her own researches and those of others into the vicissitudes of the long and distinguished career of the Royal Society.

Three minor errors escaped detection in the reading of the proofs. On page 13 the reference to Plate 10 should read "Plate 11," and on page 79 the reference to Plate 11 should read "Plate 10." In the bibliography to Chapter 3 this reviewer's article on Gresham College is attributed to the author of the immediately preceding item. On page 29 the sentence concerning William Oughtred is so worded as to suggest to the reader that Oughtred was a professor at Gresham College. Although he was a friend and frequent visitor and consultant of the Gresham professors, he was never a member of the college staff.

These relatively unimportant errors are mentioned only in order that they may be corrected in a reprinting when that is called for. One hopes that the success of the book will make an early reprinting necessary, for Miss Stimson's volume provides the best general introduction available to the history of England's oldest and most important scientific society.

Stanford University, California FRANCIS R. JOHNSON

ROBERT O. STEUER. (*Whdw*) *Aetiological Principle of Pyaemia in Ancient Egyptian Medicine.* Baltimore, Johns Hopkins Press, 1948. (Supplement to the Bulletin of the History of Medicine, No. 10.) vi + 36 pp. $1.50.

THIS important contribution to medical Egyptology was largely made while Dr. Steuer was affiliated with the Division of Medical History and Bibliography of the University of California Medical Center, San Francisco. It is based upon careful study of the Ebers, Hearst, and Berlin 3038 Medical Papyri. The Egyptian medical term, *whdw,* has been variously interpreted as meaning leprosy, haematuria, smallpox, and syphilis. Following Erman and Grapow, most Egyptologists have translated *whdw* as "pain." Ebbell suggested its identification as a disease characterized by effusion of pus. Steuer shows that none of these interpretations is adequate.

His study began through an investigation of the meaning of the hieroglyphical determinative, which Gardiner lists under "Aa2." An analysis of the occurrence of this determinative in the Kahun Medical Papyrus, as well as in other places, indicates its use in connection with putrefaction, decomposition, fecal material, and a dead body. It was these observations which led Steuer to a detailed, meticulous analysis of *whdw*. Steuer concludes that the determinative is a symbol "of procedures and materials used in the embalmer's laboratory: with intrinsic reference to putrefaction, the prevention of which was the principal goal of mummification."

Section II of Steuer's thesis develops the identification of *whdw* as a term for two aetiological concepts: one premedical as an influence or "demon" entering the body from outside, the other medical and referring to a *materia peccans* adherent to faeces, which acts upon the blood-conveying *mtw* from inside, producing putrefaction and pus. The many medical prescriptions occurring in Ebers, Hearst, and Berlin 3038 for the expulsion of pus or putrefaction are explained on this basis. Steuer concludes that *whdw* is to be interpreted as the aetiological agent of blood-corruption, with conversion of *whdw* into pus as the preliminary stage, and with blood-coagulation and putrefaction as the concluding stage.

Section III of Steuer's analysis approaches the problem from the standpoint of wound infection as considered by the ancient Egyptians. The word *whdw* does not occur in the Smith Surgical Papyrus. The Ebers Papyrus contains prescriptions to heal a wound when *whdw* occurs. Steuer takes the position that the ancient Egyptians sought complete elimination of pus from wounds as a preliminary condition to wound healing. The next three sections of the essay offer corroborative evidence that *whdw* is to be interpreted as an aetiological principle and not as a disease.

In an appendix to the study, Dr. Steuer relates his views on blood pathology with those developed by Aristotle and Hippocratic writers. There is also an appendix describing the painted limestone stele of Nefer-yu. This deals in part with considerations involving the determinative previously discussed.

Dr. Steuer has made an important contribution to medical Egyptology. His work is so thoroughly documented and his analysis is so comprehensive and logical that his interpretations can be considered sound and acceptable. His study implies a much higher level of medical theory among the ancient Egyptians than has been previously recognized. It remains to be judged whether or not this tendency to theorize in medicine may not have been a deciding factor in gradually obscuring the sound empiricism on which ancient Egyptian medicine was really based.

Galveston, Texas CHAUNCEY D. LEAKE

MACDONALD CRITCHLEY. *Sir William Gowers, 1845–1915.* A biographical appreciation. London, Messrs. William Heinemann, 1949. vii+118 pages. Illus. 17s.6d.

A BIOGRAPHY of Sir William Gowers is a welcome addition to the literature of the history of medicine. Gowers' fasciculus, Gowers' sign, and other terms associated with the name of the distinguished English neurologist have long been a part of the language of medicine, but concerning the man himself little has been known.

According to his biographer, Gowers was a man of considerable reserve and he did not have a large circle of professional friends and correspondents. Source material, accordingly, has been limited chiefly to the medical writings of Gowers himself and the personal recollections of younger contemporaries and disciples who still survive. From these and other sources the author has woven together the periods of a life rich in accomplishment.

Apprenticed to a country doctor at Coggehall at the age of sixteen, Gowers enrolled as a medical student at University College Hospital, London, two years later. That he was a good student is attested by his appointment as assistant and secretary to Sir William Jenner in 1867, after qualifying as a physician. He came under the influence of several of the ablest neurologists of that period in London. In 1870 he was appointed Medical Registrar to the National Hospital for the Paralyzed and Epileptic, an institution then ten years old. Associated with it were such neurologists as Brown-Séquard, Hughlings Jackson, Buzzard, and other leaders in British medicine. This appointment brought him into close contact with a great variety of obscure and interesting clinical problems.

Gowers soon began writing for the medical journals on a variety of subjects, his first paper being published in 1872. In the initial issue of *Brain,* which appeared in April, 1878, an article by the then thirty-three-year-old physician, was entitled "Some Symptoms of Organic Brain Disease." The following year he published a series of lectures on epilepsy, a monograph on pseudohypertrophic paralysis, an address on diagnosis of diseases of the spinal cord and a *Manual of Medical Ophthalmoscopy.* All broke new ground and represented the results of careful, detailed research. Numerous papers and monographs followed in quick succession, and Gowers early became recognized as an able physician and student of the nervous system. In 1887 he diagnosed the spinal tumor which made history as the first to be attacked by surgical methods. Victor Horsley was invited to operate, which he did successfully, establishing a milestone in the treatment of affections of the nervous system.

The first volume of Gowers' *Manual of Diseases of the Nervous System* had been published the previous year and the second appeared in 1888. It is not possible in the space of a review to mention the numerous other contributions that resulted from the industry and insight of this great neurologist. Fortunately, a complete bibliography of his published work has been appended to the volume. From the first paper, in 1872, to the last title in 1910, it lists 337 publications.

The reminiscences and sidelights of personality that embellish many biographies are largely lacking in this book. For this the author is not to be censured; they were not to be found. As a survey and appreciation of the contributions, in chronological order, of one of the founders of clinical neurology this small volume fills a real need.

Portland, Oregon O. LARSELL

A Brief History of the South Carolina Medical Association. Published by the South Carolina Medical Association, Charleston, 1948. 197 pp. 25 Illus.

About half of this centennial volume consists of the history of the State Medical Society of South Carolina, ably written by Dr. Joseph I. Waring. Although the State Society was only one hundred years old in 1948, attempts to organize the medical profession in the state (mostly in Charleston) can be traced back to 1755. Many well-known names in American medical history are connected with the state, among them those of Lionel Chalmers, David Ramsay, Josiah Clark Nott, H. W. de Saussure, etc. In 1840 there opened in Charleston what is probably the first teaching hospital in the United States. The foundation of the American Medical Association served as stimulus to combine several local societies into a State Society; several of the officers of the new society in turn played a considerable rôle in the early activities of the A.M.A. The Civil War was a terrible blow to the society as it was to many other institutions in the South, and history reveals a return of vigorous growth only decades after the catastrophe. The problem of rural health seems to have been acute in South Carolina for many years.

Forced to limit himself to a history of "organized medicine" in South Carolina, Dr. Waring has done a very fine job of collecting many relevant materials (e.g. fee bills) and of writing them up.

A kind of appendix contains short histories or materials on the history of thirteen county societies, seven miscellaneous medical societies, five specialist societies, and nine state medical institutions. Some of these, like the history of the State Board of Health, are quite interesting and well done. The book is well illustrated.

Madison, Wisconsin Erwin H. Ackerknecht

Dorothy F. Cannon. *Explorer of the Human Brain: The Life of Santiago Ramón y Cajal* (1852–1934). With a *Memoir* of Dr. Cajal by Sir Charles Sherrington. New York, Henry Schuman, Inc., 1949. xv + 303 pp., 3 pl., 9 figs. $4.00.

It is most fitting that the life and work of the great forerunner of the scientific renaissance in Spain be included in the *Life of Science Library* with the double purpose of gaining widespread understanding of science among laymen and giving useful information to scientific specialists, so often illiterate about every corner of science but their own.

D. F. Cannon's book, clearly and orderly written, and adorned with attractive anecdotal material, amply succeeds in presenting Cajal's personality and achievements at their best. After contemplating the eventful early years in Cajal's life, in due contrast with environmental, political, and social conditions, the reader wonders not so much that the mischievous, fun-loving, "problem" boy

finally changed, but that the change in due time produced in Spain one of the most preëminent men of science in the world. For then, as during nearly all Cajal's life, men's minds in Spain were under perpetual stress from political immorality, corruption, and upheaval; depressed by feelings of frustration, devastating pessimism, and even despair at the termination of the war with the United States. Due to lack of scientific tradition and therefore of provision for the establishment of scientific careers, histological studies were derisively called "celestial anatomy." Physicians were esteemed more for their social graces and background in the humanities than for their skill in surgery or their knowledge of medicine. Aware of all this, Cajal was convinced that Spain's major problem was one of culture. As his reaction, under the impulsion of the purest and most legitimate patriotism, he unflinchingly maintained and proved by his own example that, contrary to prevailing views, his fellow countrymen had capabilities for making contributions of permanent value to science. In this connection his views were best reflected in *Reglas y Consejos para la Investigación Biológica,* a book probably not seen by his biographer, since the title is repeatedly misquoted as *Reglos,* and the contents supposedly written for "boys of scientific age," when in reality Cajal had dedicated them "to Spanish studious youth [adolescents], to promote among them love and enthusiasm for laboratory enterprises" (Preface to second edition). An enthusiastic eulogy of this book that the reviewer wrote early in his career (see *Gaceta médica de México, 1920, 1, 350*), and by which Cajal was much gratified (*ibid.,* p. 503), shows that this production of his was early appreciated and exerted an influence on our Continent.

Dr. Cannon's vivid story fully succeeds in evoking the most salient features of Cajal's life from his early years, through the period of his most outstanding scientific achievements, and up to his declining years when, though largely repaid by seeing that, partly from his endeavours, a school had come into being, he could not avoid being hurt by many depressing factors: by a succession of three dictatorships, and then the oppression from the republicans in power whose cause he had previously championed so enthusiastically; by witnessing helplessly the announcement, as rediscoveries, of facts he had already unearthed in the nineties, but which had remained unknown to other investigators; by the loss of his loving wife, and by the progress of arteriosclerosis, due to which he began to show a bit too much vehemence in his acts. About May 1930, during a vacation from Cambridge, England, desiring to make Cajal's personal acquaintance, the reviewer appeared one day in his laboratory, without any previous announcement of his visit, wearing plus-fours and carrying a camera. Don Santiago thought that it was a tourist anxious to take a picture of him and reacted at once with such vehemence that he could not hear the words his distinguished pupil, Fernando de Castro, mumbled in dejection, trying to tell him something about his old friend and admirer from México. De Castro suggested trying the next day for a less tempestuous moment, but the visitor decided not to insist any more,

because his first experience had been a painful one; after all, it was like that of a man who knowing a most beautiful lady from her picture made the mistake of going to see her when over eighty.

Foremost in the biography of a scientist is the need to disclose and properly to emphasize the highlights of his portrait—his more outstanding achievements. Cannon in full recognition of this duly emphasizes Cajal's epoch-making discoveries on the fine anatomy of the nervous system. These were achieved only after years of long, exacting labor, directed on the one hand toward perfecting or discovering new methods for the staining of tissues, and then to their application in elucidating the fine anatomy of organs, cells, and tissues, more particularly of the nervous system. In this he also profited greatly by using embryos, the study of which, from the beginning of the century, was known to make the structure of adult forms more intelligible. Important results accumulated at once and gave Cajal such a masterly position in this particular field that Sherrington wonders if it is too much to say of him that he was the greatest anatomist the nervous system has ever known (*Memoir,* p. xii). A most pertinent remark to be added is that Cajal's facts and arguments greatly contributed to the establishment of the "neuron" theory, not purely in a structural sense, but inspired by views similar to those which led Albrecht von Haller a century earlier to be interested in *anatomia animata.* Because, as pointed out by Sir Charles, Cajal "solved at a stroke the great question of the direction of the nerve-currents in their travel through the brain and spinal cord," thus making "possible even for a tyro to recognize at a glance the direction taken by the nerve-current in the living cell, and in a whole chain of nerve-cells." It was for this that the Nobel Prize for 1906 was deservedly awarded to him jointly with Camillo Golgi, "in recognition of their work on the structure of the nervous system."

The real values and degree of novelty of scientific production are only appraised by contrast with the background of environmental conditions and by paying due heed to influences exerted by currents of thought near and far. Since in this particular field of inquiry they were entirely outside Spain, the reader is informed that in order to get in touch with them, Cajal had to subscribe to foreign journals. But as this information would leave the reader at a loss in arriving at any conclusions on such an important question, the book includes (p. 124 ff.) a brief, "quick glance at the nervous system, to understand Cajal's work in the creative period." It is only to be regretted that the reader is left liable to confusion because of several slips in this section: functional properties of the synapse are presented one-sidedly in terms of the time-worn hypothesis that "neurons contract, that is the nerve cells draw in their prolongations as living protoplasma does when it is irritated" (p. 265). Central summation, confusedly mixed with combined sensations (p. 128), appears reduced to its spatial aspect, with neglect of the temporal, and contrasted with inhibition (p. 129) "as the obverse of a coin is to its face." As a matter of fact, summation can be readily demonstrated inde-

pendently for the two conditions which in fact are of opposite character, *i.e.*, stimulation and inhibition, and also when both operate together, in which case summation occurs algebraically. These and other slips could have been avoided by perusal of items in the list of neurological references in pages 290–294 of the book analyzed.

México, D.F. J. J. IZQUIERDO

S. LYLE CUMMINS. *Tuberculosis in History from the 17th Century to Our Own Times.* Baltimore, Williams and Wilkins Company, 1949. 205 pp., 12 pl. $4.50.

THE purpose of this monograph is to furnish a picture of the lives of the principal contributors to our knowledge of tuberculosis in relation to their times. It is not intended to be a "history of tuberculosis." The account is not continuous. Many of the sketches have been presented previously as separate papers before the Section of the History of Medicine of the Royal Society of Medicine.

The volume opens with a group of biographies under the caption "The British School." Included are brief and interesting accounts of the chief British clinicians who contributed to an early understanding of tuberculosis. The next section takes up the lives of "the early continental phthisiologists" and here the reader will find short and highly sympathetic sketches of the most distinguished clinicians and pathologists from Auenbrugger to Villemin. The concluding section is devoted to "Two Remarkable Figures in the History of Tuberculosis"—Edward Livingston Trudeau and Robert Koch.

Professor Cummins was much interested in schools and their influence upon men, and the political relations of the schools themselves to the events of their day. He was also deeply interested in his heroes of medicine as *people*. In his own words, "We want *stories* of our great ones and how they bore themselves in their most human moments." The latter quotation came from his chapter on Thomas Sydenham, whose only contribution to tuberculosis is found in a short note, *De Phthisi*. Dr. Cummins would have liked to include much more of the life of this great English physician but had little material on which to draw, for Sydenham made no mention of his singular adventures in his own writings.

The author is perhaps more sympathetic than most biographers would be with the advice and misadvice of the physicians he chose to delineate, and in fact the chief and perhaps only criticism of the book is that he has been too gentle with the mistaken and not infrequently stubbornly authoritarian views of some of them.

It is doubtful if any reviewer would quarrel with Cummins' selection of names. Pathology, diagnosis, and clinical medicine are well represented. With the exception of Benjamin Marten, whose speculative contribution to the theory

of contagion in tuberculosis was discovered relatively recently by Charles Singer, all of the physicians included are well known. Marten's contribution was pure theory and in no way detracts from the magnificent contribution of Jean Antoine Villemin in this field. Villemin himself was a pathetic and relatively neglected figure in his own time, and Professor Cummins strikes out heartily to give him his due.

The two final chapters are eulogies. The account of Edward Livingston Trudeau is an emotional, admiring analysis based on careful rereading of the famous *Autobiography*. The final chapter on Robert Koch analyzes his contributions with special reference to immunization against tuberculosis, which appears to Cummins to be a field with great promise for the future.

An excellent three-page introduction by Sir Arthur Salusbury MacNalty points up in clear fashion the highlights of the book. Students of the history of medicine will enjoy reading the volume both for its concise picture of a group of famous men and for the author's generous appreciation of their contributions to the understanding of tuberculosis.

Philadelphia, Pennsylvania ESMOND R. LONG

EMERSON CROSBY KELLY. *Encyclopedia of Medical Sources*. Baltimore, Williams and Wilkins, 1948. v + 476 pp. $7.50.

HENRY ALAN SKINNER. *The Origin of Medical Terms*. Baltimore, Williams and Wilkins, 1949. viii + 376 pp. $7.00.

EDMUND ANDREWS. *A History of Scientific English. The Story of its Evolution Based on a Study of Biomedical Terminology*. New York, Richard R. Smith, 1947. viii + 342 pp. $7.50.

READERS of this *Journal* will greet with pleasure the name of Dr. Emerson Crosby Kelly, Associate Professor of Surgery at Albany Medical College. The five volumes of Dr. Kelly's *Medical Classics*—a publication which deserves to be revived —made conveniently available to the American reader some fifty of the greatest writings in medical literature, from the era of Hippocrates to that of William Welch. Dr. Kelly now increases his claim on our gratitude by the publication of an *Encyclopedia of Medical Sources*. This work, he tells us, came into being after he had attempted to find the documentary sources of a number of familiar eponyms and had suffered the exasperating frustrations which presumably are an occupational disease of source-hunters.

Dr. Kelly's new encyclopedia contains more than seventy thousand listings, most of which are the names of physicians. A few incidental entries refer to such things as Balsam of Peru, Katayama disease, etc. Each personal name is followed by a concise statement of the man's nationality, field of work, and dates. Below this are listed the eponyms or principal contributions, each of which is docu-

mented by one or more bibliographical citations. The main purpose of each entry is to provide the reader with key references to source material. Dr. Kelly says in his preface:

> No attempt has been made to pin down the first description of any condition because someone, in due time, comes forward with an earlier paper and reference. Priority is an irritating and troublesome study. A search for the earliest *or* best article has been conducted and great care has been exercised in copying the correct title with exact reference. . . .

Typical of the less elaborate entries is the following:

> Sappey, Marie Philibert Constant. French anatomist. 1810–1896.

An example of a more elaborate entry is found under the name of Van Slyke, who is credited with no less than ten principal contributions, backed by nine bibliographical citations and several cross references. The reviewer checked a judicious number of random references in various parts of the *Encyclopedia* and found no errors and few misprints. He has used the book for several months in the course of various historical studies, and has found it immensely helpful. Since the study of the history of medicine is in no wise conducive to the acquisition of wealth, readers of the *Journal* are advised that Dr. Kelly's encyclopedia is about half as expensive as Garrison and Morton's Medical Bibliography and is at least equally useful. The book ends with a well-stocked index of some thirty-two double-columned pages.

Another encyclopedic volume, of special content and special intent, is *The Origin of Medical Terms* by Henry Alan Skinner, M.B., F.R.C.S.(C), Professor of Anatomy at the University of Western Ontario. This book is designed especially for modern medical students; *i.e.,* earnest young men and women who are suddenly obliged to master the technical terms of anatomy and physiology but who have not had adequate schooling in Latin, Greek, and English. Dr. Skinner's encyclopedia contains approximately 2,800 entries, which range from Abbé, Abderhalden, Abduct, Abernethy . . . through Morgagni, Morgue, Moron, Morphine . . . to Zuckerkandl, Zygoma, and Zymogen. An average entry runs to something under one hundred words. Items deemed exceptionally important, such as Nerve and Oleum, receive much more extensive treatment. The text is notably clear, interesting, and informative. Some of the entries—e.g., Diabetes, Electricity, Galen, Morgagni—are in reality short essays, almost self-sufficient and almost always interesting. The derivations have been rendered with great care, alternative possibilities being given where scholars are in conflict. In some instances Arabic words are transliterated incorrectly. Thus under Nucha, the word *nooḳah* should have been written nukhā'. For this peccadillo the author more than atones by the interesting entry Arabic Words.

The *Encyclopedia* is supplemented by a list of 105 references, a table of the Greek alphabet, and a table of chemical elements and their discoverers. A few minor errors have crept into the table of elements.

Dr. Skinner's *Encyclopedia* deserves a hearty welcome. It will instruct, stimulate, and entertain the student and will be a better preceptor than some of the medical dictionaries which are at present so much in fashion.

In an entirely different category from either of the foregoing is *A History of Scientific English. The Story of its Evolution Based on a Study of Biomedical Terminology* by the late Dr. Edmund Andrews. Studies in medical philology—especially comprehensive systematic treatises—are scarce; this fact of itself almost suffices to guarantee Dr. Andrews' book an attentive reception by scholars. Unfortunately a careful perusal will reveal that many parts of the text are marred by a digressive style, in places difficult and unclear. The introductory chapter is one of the least intelligible in the book. Apparently one of the author's purposes was to follow the development of modern scientific terminology in relation to the growth of knowledge. The term "scientific English" as used in the title seems to mean "scientific vocabulary."

Much material of doubtful relevance is included in the text. Thus, in order to supply background for the few Cretan words which have come down to us through Greek, the author found it necessary to compose a description of the ruined buildings at Knossos, sanitary conveniences and all. In order to estimate the cultural state of the Greeks in the second millenium before Christ, he used the Polynesian peoples as a standard of comparison. This was felt to necessitate a discussion sixteen pages in length, which is followed by a five-page diatribe on the doctrine of Nordic supremacy.

The positive merits of the book are considerable. Despite great difficulties inherent in the subject matter and despite the many lacunae in existing knowledge, the author was able to compose a reasonably coherent and sequential account of the development of the modern English medical and biological vocabulary. This is a feat notable for its rarity and difficulty. Dr. Andrews' book is perhaps best regarded as a heroic pioneer effort which will encourage emulation without failing to win respect.

The Mount Sinai Hospital, New York SAUL JARCHO

NOTES ON CONTRIBUTORS

JOHN A. BENJAMIN, M.D., is a member of the Department of Surgery (Division of Urology) at the Strong Memorial Hospital, Rochester, New York.

C. B. COSBY, B.S., M.A., was formerly Assistant Professor of Biophysics at the Baruch Center of Physical Medicine, Medical College of Virginia. He resides at 2802 Garland Avenue, Richmond 22, Virginia.

M. B. ETZIONY, M.A., M.D., is a member of the Department of Medicine, Jewish General Hospital, Montreal, Canada.

WILLIAM J. MALONEY, M.D., a graduate of the University of Edinburgh (1905), was formerly professor of nervous and mental diseases at Fordham University. He is the author of several books, and translated Pierre Budin's *Le Nourrisson* (1907) and Ivar Wickman's *Acute Poliomyelitis* (1913).

CHARLES F. MULLETT, Ph.D., is Professor of History at the University of Missouri and has written extensively on the history of medicine.

LOUIS H. RODDIS, Captain (MC), U.S. Navy, Ret. Act., is Editor of the *Naval Medical History of World War II*. He lives at 4420 Braeburn Road, San Diego, California.

GEORGE ROSEN, Ph.D., M.D., is Editor of this *Journal*.

DOROTHY M. SCHULLIAN, Ph.D., is in charge of the reference work and of incunabula at the History of Medicine Division of the Army Medical Library, Cleveland, Ohio.

SAMUEL WOOD, since 1902 a member of the Library staff of the Royal College of Surgeons of England, has written articles on medical history in the *Lancet, Quarterly Review, British Journal of Ophthalmology*, etc.

Printed in the United States of America
By The Hildreth Press, Inc.
Bristol, Connecticut

Health Insurance in the United States 1910-1920

ODIN W. ANDERSON*

THE decade from 1910 to 1920 represents the first clearly delineated period in the history of health insurance in the United States. It was a period in which agitation emerged, reached a certain stage of development, and then subsided. No legislation was enacted. The movement seemed to vanish altogether, and the evidence indicates that it was premature.

American Association for Labor Legislation

The organization which was the spearhead of agitation for health insurance[1] was the American Association for Labor Legislation.[2] It was organized in 1906, and it grew out of the International Association for Labor Legislation meeting in Paris in 1900. Steps were taken to organize an American association at the annual meeting of the American Economic Association held in Baltimore in 1905. The eminent economist, Richard T. Ely, became the first president; John R. Commons, known for his work in labor economics, was elected secretary; and John B. Andrews, another persistent worker in economic reform, became treasurer. These men were prominent leaders in their fields, academically as well as in practice. Ely and Commons were members of the Department of Economics at the University of Wisconsin.

The organization grew steadily from 165 members in 1906 to over 3,300 in 1913. From then on, the membership was quite constant until the thirties when it began to decrease. In 1942 the Association passed out of existence when its president since 1910, John B. Andrews, died. The membership was composed of economists, social workers, sociologists, political scientists, *et al.* interested in social reform. Considering the nature of the membership it was anything but "radical" or "revolutionary" in dictionary definition of the words. In 1913, about the time when action toward health

* London, Canada.

[1] Early in 1916 the Committee on Social Insurance of the American Association for Labor Legislation changed officially from *sickness insurance* to *health insurance* because: (1) The term sickness insurance had been adopted and had been in use for some time by commercial insurance companies; (2) It seemed to emphasize the preventive character of the measure; (3) It had the weight of British precedent behind it. (Rubinow, I. M. *Standards of Health Insurance.* New York, Holt, 1916, p. iv.)

[2] Hereafter abbreviated A.A.L.L.

insurance was beginning, the officers and members of the administrative council were: Jane Addams, Louis D. Brandeis, Richard T. Ely, Samuel Gompers, John B. Andrews, Woodrow Wilson, Sophonisba P. Breckenridge, Edward A. Filene, Lee K. Frankel, Andrew Furuseth, Florence Kelley, Roscoe Pound, I. M. Rubinow, F. W. Taussig, C.-E. A. Winslow, Paul U. Kellogg, and Carl E. Parry. These are familiar names to students of social problems.

The first annual meeting was held in Madison, Wisconsin on December 30–31, 1907. The Association formulated plans for an investigation of industrial accidents, diseases, and poisons.[3] Great stress was placed on the economic loss from illness, premature death, and so on. This was the ideological framework in which the Association operated. It was an attempt to improve society within the current economic and social structure. Workmen's compensation, one facet of the problem, was greatly emphasized as a method for reducing industrial accidents and diseases and for protecting the earning power of the workers.

After the first meeting in 1907 state branches were established in Illinois, 1908; Minnesota and New York, 1909; and later in Pennsylvania, Ohio, Michigan, and Missouri. In 1909 permanent headquarters were established in Madison, Wisconsin (later moved to New York City) and the memberships had reached 903. The Association was supported entirely by membership fees and voluntary subscriptions, but it was hoped that the state branches would be of assistance later.

Health insurance was considered the next logical step after workmen's compensation since workmen's compensation protected the workers from the economic loss of illnesses and accidents rising out of employment, while health insurance would cover the worker for illnesses and accidents outside of employment. This step seemed very logical after the first flush of an unexpected and relatively easy victory in workmen's compensation. However, as will be seen, social movements do not necessarily develop "logically" but respond to the pushes and pulls of the social situation at the time. This is what the social reformers during the first period failed to evaluate adequately.

At the National Conference of Charities and Corrections (at present the National Conference of Social Work) in 1911, Louis D. Brandeis, an important member of the A.A.L.L., discussed the feasibility of social insurance as a means of providing against sickness, disability, old age, and

[3] American Association for Labor Legislation. Proceedings of the First Annual Meeting, Madison, Wisconsin, December 30–31 1907, p. 5.

unemployment. A Committee on Standards of Living and Labor was appointed specifically to investigate and formulate standards of care for occupational hazards. This committee released a report in 1912 recommending some form of insurance to offset the heavy losses from accidents and sickness.

In 1912 the A.A.L.L. established a Committee on Social Insurance, the first of its kind in the United States. Twelve of the fifteen people influential during this period were members of this committee. Three of them were also members of the Social Insurance Committee established by the American Medical Association[4] in 1915: Alexander Lambert, I. M. Rubinow, and later S. S. Goldwater, all physicians. As will be seen, these cross-connections had interesting results.

The A.A.L.L. organized the first American Conference on Social Insurance held in Chicago in June, 1913. At the conference I. M. Rubinow delivered what was probably the first paper on health insurance in the country. At least it was the first article on that subject to appear in the *American Labor Legislation Review*.[5] Drawing on the experience in Europe, Rubinow predicted developments in this country that are now coming to pass:

> A new movement for a social policy must meet its strongest opponent in the fetishism of self help. Even after the advantages of [compulsory] insurance over individual provision became apparent, voluntary insurance remains the creed for some time. Thus the earliest efforts of organized society in Germany were for regulation of voluntary benefit societies, so as to make them safe and efficient.[6]
>
> The next step is to subsidize these voluntary insurance institutions, and thus to stimulate their growth. The fetishism of free self help is still strong, and the subsidy is granted not without misgivings. It is small, so as not to smack of charity. Its purpose is educational rather than financial.[7]
>
> But all these systems of "assisted liberty" . . . are only the first steps toward a well planned social policy.[8]

At the seventh annual meeting of the A.A.L.L. held in Washington, D.C., December 30–31, 1913, Joseph P. Chamberlain delivered the first paper on health insurance to be given at the annual meetings.[9] His purpose was to lay the groundwork for thinking on health insurance should the states and Congress take definite action. He recommended a compulsory health insurance system. At the same meeting Lee K. Frankel suggested that standard reporting forms be distributed to fraternal orders, trade

[4] Hereafter abbreviated A.M.A.

[5] Rubinow, I. M. "Sickness insurance." *Amer. Labor legis. Rev.*, 1913, *3*, 162–171.

[6] *Ibid*, p. 166.

[7] *Ibid.*

[8] *Ibid.*, p. 167.

[9] Chamberlain, Joseph P. "The practicability of compulsory health insurance in America." *Amer. Labor legis. Rev.*, 1914, *4*, 29–72.

union plans, and insurance companies, in order to obtain some definite statistical data on illness in the United States. There was a tendency to take the need for granted. In any case the A.A.L.L. made a special study of voluntary health insurance in New York City in 1914. The conclusion was that it was inadequate. About the same time the Association sent Olga S. Halsey to Great Britain to study the health insurance system there.[10]

At the ninth annual meeting of the A.A.L.L., December 28–29, 1915 Frankel reported on a morbidity study by the Metropolitan Life Insurance Company in two cities, Rochester, New York, and Trenton, New Jersey. Later, after the United States entered World War I, the results of the physical examinations for the draft were utilized as evidence of the need for a system of compulsory health insurance.

In 1914 the Committee on Social Insurance adopted preliminary standards for drawing up a health insurance system. They were:[11]

(1) The system should be compulsory with contributions from employer, employee, and the public. (2) Wage earners under a certain income should be covered. (3) Those who were not in the covered groups should be able to join the system voluntarily. (4) There should be a system of invalidity insurance (disability compensation) supplementary to health insurance. (5) The system should be administered by employers and employees under public supervision. Private insurance carriers properly supervised might be utilized. (6) There should be emphasis on prevention of illness wherever possible.

During the same year a subcommittee of the Committee on Social Insurance was appointed to study the field of health insurance and draft a bill in preparation for an active campaign in the states and in the Federal Government. Over a year later, on November 5, 1915, the Executive Committee of the A.A.L.L. voted unanimously that its Committee on Social Insurance should be encouraged to prepare a complete draft of a bill for health insurance to be introduced in several state legislatures in January 1916. This was done and the first edition of 8,000 copies was exhausted within a month. A second edition of 5,000 copies was printed in the middle of December.[12] At the same time it was reported that the A.M.A. had ap-

[10] Prior to the enactment of compulsory health insurance in Great Britain in 1911 two American investigators were sent to Europe by the Russell Sage Foundation to report on workingmen's insurance of various types. Their book was published in 1910: Frankel, Lee K. and Dawson, Miles M. *Workingmen's insurance in Europe*. New York, Charities Publication Committee, 1910. 477 pp. (Russell Sage Foundation.) Prior to 1908 the only important works on workingmen's insurance that had been published in the United States were John G. Brooks' *Compulsory insurance in Germany*, published in 1893 as a special report of the U. S. Bureau of Labor; the comprehensive work of W. F. Willoughby, *Workingmen's insurance*, which appeared in 1898; and a report on *Industrial accidents* by A. F. Weber of the New York State Bureau of Labor in 1899.

[11] *Amer. Labor legis. Rev.*, 1914, *4*, 595–596.

[12] *Amer. Labor legis. Rev.*, 1916, *6*, 104.

pointed a committee to co-operate with the Committee on Social Insurance "in putting the finishing touches on the medical sections of the bill,"[13] but more of that later. Also, several other important organizations had appointed committees early in 1916 to study the proposal of the A.A.L.L. With this great interest and seemingly firm support the secretary optimistically wrote in the annual report: "The opportunity now appears good for a big educational campaign for the conservation of health, with fair prospects for legislative commissions to investigate in 1916 and for compulsory health insurance legislation in this country in 1917."[14] So much progress in industrial reform was taking place during this period that optimism was rife. But opposition was to emerge very rapidly after the A.A.L.L. had unstrategically and naively exposed itself completely. Well-planned social strategy was not part of its technique of social action. The A.A.L.L. assumed that a social reform would win on its own merits.

The A.A.L.L. justified the need for a system of compulsory health insurance upon a recognition of the following six points. It seemed that a formal justification had not been presented earlier because the need should have been self-evident:[15]

(1) High sickness and death rates are prevalent among American wage-earners. (2) More extended provision for medical care among wage-earners is necessary. (3) More effective methods are needed for meeting the wage loss due to illness. (4) Additional efforts to prevent sickness are necessary. (5) Existing agencies cannot meet these needs. (6) Compulsory contributory health insurance providing medical and cash benefits is an appropriate method of securing the results desired.

A popular slogan attending the introduction of workmen's compensation was "Safety-First" because it was assumed that it would offer an incentive for the reduction of industrial accidents and thus keep production costs down. As a counterpart a popular slogan repeated many times in connection with the agitation for health insurance was "Health First," since it was assumed that an emphasis on illness prevention would follow and thus reduce the cost of health insurance.

The proponents of health insurance made almost as extravagant claims for the social benefits of such insurance as its opponents made against it. Irving Fisher of Yale in his presidential address at the tenth annual meeting of the A.A.L.L. in December 1916 said:

At present the United States has the unenviable distinction of being the only great industrial nation without compulsory health insurance.

Germany showed the way in 1883 under the leadership of Bismarck. This act was

[13] *Ibid.*, 104–105.
[14] *Ibid.*, p. 105.
[15] *Amer. Labor legis. Rev.*, 1916, 6, 155.

the first step in her program of social legislation. Her wonderful industrial progress since that time, her comparative freedom from poverty, reduction in the death rate, advancement in hygiene, and the physical preparedness of her soldiery, are presumably due, in considerable measure, to health insurance.[16]

The annual meeting of 1916 was the high point of discussion of health insurance in the A.A.L.L. The Association held joint sessions with the American Economic Association, American Sociological Society, American Statistical Association, American Political Science Association, and the City Club of Cincinnati. The meetings were held in both Columbus and Cincinnati.

The ubiquitous I. M. Rubinow, without whose presence it would seem that there would not have been any agitation for health insurance at all, summed up the status of the movement at the 1916 meeting. He never failed to take both the long- and short-term views of social developments. He said:

Essentially the health insurance movement spreads along the same lines of development as did the (workmen's) compensation movement seven or eight years ago. But the stages of agitation, private committees, government commissions, and preparation of bills follow one another in such rapid succession that they appear to go on at the same time. Scarcely a year has gone by since the organized health insurance movement began in earnest, and here we are, gathered for a careful consideration of the administrative details, with two entire sessions devoted to questions of administration, an entire session to consideration of insurance organization, with such minute subdivisions of the subject that I am asked to consider only one of the many possible forms of insurance carriers.[17]

But even as ardent an advocate as I. M. Rubinow was afraid that the enthusiasm for and confidence in health insurance were too far ahead of popular information on the subject.[18] As long as health insurance was discussed without relation to specific and concrete actions, the potential opponents apparently paid no attention to what was in the offing. However, when state commissions were established to study the subject and make recommendations and bills were introduced in state legislatures, the proponents were surprised at the opposition's vehemence and gathering strength. The controversy was beginning to come more into the open, even within the Committee on Social Insurance of the A.A.L.L. Frederick L. Hoffman, a statistician for the Prudential Insurance Company of America, resigned from the committee in 1916 when it endorsed compulsory health insurance. Thereafter he became an outspoken and vigorous opponent of compulsory health insurance. His name stands out as prominently among the opposi-

[16] Fisher, Irving. "The need for health insurance." *Amer. Labor. leg. Rev.*, 1917, *7*, 9–23.

[17] Rubinow, I. M. "Health insurance: the spread of the movement." *Survey*, 1916, *36*, 408.

[18] Rubinow, I. M. "Health insurance through local mutual funds." *Amer. Labor legis. Rev.*, 1917, *7*, 69.

tion as does Rubinow's name among those in favor. In fact, at times it seems that Hoffman and Rubinow became opposing symbols of struggle. Both of them were inveterate travelers and lecturers, both used words effectively, and both had a following.

In 1916 Rubinow went on a speaking tour through eight states—Massachusetts, New York, New Jersey, Pennsylvania, Maryland, Ohio, Michigan, and Illinois. He reported that within twelve months he addressed over one hundred meetings with a combined audience of 50,000. While residing in California in 1915 he delivered over seventy-five public addresses in addition to his duties as the secretary of the state health insurance commission established to investigate the need for health insurance. He spoke to medical societies, women's clubs, city clubs, open forums, and luncheon clubs.

Thus the Committee on Social Insurance of the A.A.L.L. and other members of the Association set the stage. By the end of 1918 the movement had reached its height. A brief summary of the groups, individuals, and states involved in the movement will provide a backdrop for the more detailed consideration of their activities.

Numerous organizations formed special committees to consider health insurance, among which were: Actuarial Society of America, American Association of Industrial Physicians and Surgeons, American Association of Mechanical Engineers, American Hospital Association, American Institute of Homeopathy, American Medical Association, American Nurses' Association, American Pharmaceutical Association, American Public Health Association, International Association of Casualty and Surety Underwriters, National Association of Manufacturers, National Conference of Charities and Corrections, National Convention of Insurance Commissions, National Organization for Public Health Nursing.

The following states established commissions to study the subject: California 1915, 1917, Connecticut 1917, Illinois 1917, Indiana 1919, Massachusetts 1917, New Hampshire 1917, New Jersey 1917, Ohio 1917, Pennsylvania 1917, Wisconsin 1917.

In 1916 health insurance bills were introduced in New York, Massachusetts, and New Jersey. In 1917 similar bills were introduced or reintroduced in: California (constitutional amendment), Colorado, Connecticut, Illinois, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, Ohio, Oregon, Pennsylvania, Washington, Wisconsin.

Many prominent people felt impelled to make some statement regard-

ing health insurance, such as economists, statisticians, social workers, physicians, federal administrators, and many others. The top level leadership in the country was certainly involved, but the broader base of public support was lacking, except possibly in New York state. No bills in the state legislatures were enacted.

STATE ACTIONS

The state commissions were direct outgrowths of the activity of the A.A.L.L. Legislative investigations in many subjects had been common in the states during those years and legislative practice had approved the idea of committing important matters to special study by commissions created for the purpose. Their primary objective was to supply basic facts upon which sound legislation might be drafted.

The first state commission in the United States to deal with health insurance was California in 1915–1916. I. M. Rubinow was engaged as its expert. The commission made a study of the local sickness situations among wage earners, relationship between sickness and dependency, and related studies, and how the problem was being met. Public hearings were held after the completion of the study. Three to four hundred people attended, and there was a great deal of newspaper publicity. A bill was in preparation in 1917, but the commission felt that much popular educational work was necessary if the constitutional amendment was to be adopted.[19] Hiram W. Johnson, governor of California, endorsed health insurance in his message to the legislature on January 17, 1917.[20]

In its report the commission recommended compulsory health insurance, listing as two of the reasons: (1) It appears logically to be the next step after accident compensation; (2) It offers the least actuarial and organizational difficulties as compared with other more complicated branches of social insurance which require provision of substantial reserves.[21] Judging from the last statement it would seem that the administrative problems in health insurance were grossly underestimated. Another reason the commission gave was that in both the fields of old age and unemployment insurance national action might be necessary, but it was thought that the problem of dependency due to sickness was largely a local one amenable to state action.[22]

The constitutional amendment was defeated after intensive activity by the medical profession, commercial insurance, and others. Practically

[19] *Amer. Labor legis. Rev.*, 1918, *8*, 90–91.
[20] *Amer. Labor legis. Rev.*, 1917, *7*, 208.
[21] California. Social Insurance Commission. *Report, January 25, 1917*. Sacramento, The Commission, 1917. p. 16.
[22] *Ibid.*

every voter in California received a little pamphlet on the front side of which was a picture of the Kaiser and the caption, "Born in Germany. Do you want it in California?"[23] Another report of the commission was issued in 1919 with the same recommendation as the previous one.[24] Thereafter activity in California subsided.

The state in which the most intense activity took place was New York. A draft of the "standard bill" drawn up by the A.A.L.L. was introduced in the New York legislature in 1917, 1918, and 1919. Governor Alfred E. Smith recommended health insurance in his message to the New York legislature on January 1, 1919.[25] Compulsory health insurance for workers was also recommended by the New York State Reconstruction Commission in a report to the Governor on April 29, 1919.[26] Health insurance in New York state had the support of the newspapers, organized labor, the Women's Joint Legislative Conference, an organization formed by a coalition of the Women's Trade Union League, Y.W.C.A., the Consumer's League, and the Women's Suffrage Party. At the hearings held on March 19, 1919 a Christian Science representative, some physicians, and officials of the merchants' and manufacturers' association appeared against the bill. It was reported that sympathetic Republicans joined with the Democrats in the Senate to pass the bill, but meanwhile, Speaker Thaddeus C. Sweet, an upstate manufacturer, chairman of the Rules Committee and head of the Republican organization in the Assembly, announced that he would not permit any of the social welfare bills to pass. He threatened to recess the assembly indefinitely or until the Senate capitulated and agreed to adjournment in order to defeat these measures.[27] This caused a great furor in the state, but no health insurance bill was passed. However, in 1920 the bill was reintroduced.

In another state, Massachusetts, the first hearing on a compulsory health insurance bill in the United States was held in Boston on March 1, 1916. It was reported that interested citizens overflowed a special meeting room into the corridors. Carroll W. Doten of the Massachusetts Institute of Technology and the Committee on Social Insurance of the A.A.L.L. helped to draft the bill and acted as its sponsor. Those appearing in favor were: Michael M. Davis, Jr., Superintendent, Boston Dispensary; Dr. Richard C. Cabot, Massachusetts General Hospital; Mary Beard, District

[23] Reported by John A. Lapp to the 34th Annual Meeting of the Conference of State and Provincial Health Authorities of North America, Atlantic City, June 6–7, 1919. Proceedings. p. 126.

[24] California. Social Insurance Commission. *Report, 1919.* Sacramento, The Commission, 1919. 132 pp.

[25] *Amer. Labor legis. Rev.*, 1919, *9*, 225.

[26] *Ibid.*, p. 250.

[27] *Ibid.*, p. 237.

Nurses' Association; Dr. Frederick Cotton, American Medical Association; Henry Abrams, Cigar Makers' Union; Irving Fisher, Yale University; John B. Andrews, Olga Halsey, and Joseph L. Chamberlain, New York (A.A.L.L.). A few manufacturers appeared in opposition.[28]

In addition to the recommendations for health insurance by Governors Hiram Johnson of California and Alfred E. Smith of New York, other governors made similar recommendations to their legislatures in Massachusetts, New Hampshire,[29] New Jersey,[30] and Wyoming.[31]

The state commissions held two national conferences for the purpose of considering problems and methods of investigation. One conference was held in 1917 in connection with the 11th annual meeting of the A.A.L.L. in Philadelphia, December 27–28, 1917, and the other was held in Cleveland, Ohio, on May 13, 1918.

By the end of 1919 all the state commissions had issued reports. As summarized by John A. Lapp, chairman of the Ohio commission:[32] Eleven official state commissions had considered and reported on health insurance. Six commissions—Massachusetts (1917), California (1917 and 1919), New Jersey (1918), Ohio (1919), and New York (Reconstruction Commission, 1919)—reported in favor of compulsory health insurance. Four commissions—Connecticut (1919), Wisconsin (1919), Illinois (1919), and Massachusetts (1918)—reported against compulsory health insurance. One state, Pennsylvania, reported on the extent and burden of sickness, pointing out the need for action and asking for a new commission to consider health insurance legislation as the solution of existing problems. In 1920 the Pennsylvania commission sent William T. Ramsay, chairman of the commission, and Ordway Tead, special investigator, to England to study the British health insurance system. The previous year the A.A.L.L. had sent its secretary, John B. Andrews, for the same purpose.

Thus official state actions came to a rather abrupt end. The chairman of the Ohio commission felt that the state commissions reporting in 1919 were "somewhat handicapped by the confusion into which the public mind had been thrown by the misleading, malicious and false statements emanating from an interested and active commercial insurance opposition led by the Prudential Insurance Company and the Insurance Economics Society of Detroit."[33]

[28] "Health insurance now a practical issue." *Survey*, 1916, *35*, 691.

[29] *Publ. Affairs Inform. Serv.*, 1917, *3*, 207.

[30] *Publ. Affairs Inform. Serv.*, 1918, *4*, 262.

[31] *Publ. Affairs Inform. Serv.*, 1919, *5*, 241.

[32] Lapp, John A. "The findings of official health insurance commission." *Amer. Labor legis. Rev.*, 1920, *10*, 27.

[33] *Ibid.*, p. 31.

Federal Actions

While commissions to study health insurance were being established by the state legislatures and while bills were being introduced, there was also some activity on the federal level.[34] Early in 1916 a resolution was introduced in the House (H. J. Res. 159) "for the appointment of a commission to prepare and recommend a plan for the establishment of a national insurance fund for the mitigation of the evil of unemployment." The resolution also included sickness and disability. Hearings before the Committee on Labor of the House of Representatives were held on April 6 and 11.[35]

Only one witness, Samuel Gompers, president of the American Federation of Labor, appeared to oppose the resolution. The treasurer and the vice-president of the same organization, John B. Lennon and James O'Connell respectively, favored compulsory health insurance. The president of the Order of Railway Conductors, Austin G. Garretson, did likewise. Others testifying in favor were the well-known I. M. Rubinow, Miles M. Dawson, John B. Andrews, Joseph P. Chamberlain, James L. Cowles, Royal Meeker, and others. Samuel Gompers was afraid that the commission would be prejudiced in its findings and recommend compulsory insurance of one type or another. He wanted a study of voluntary methods.

After the hearings in April, H. J. Res. 159 was apparently reintroduced as H. J. Res. 250. On July 1, 1916 the Committee on Labor recommended to Congress that the resolution be passed.[36] It contained a recommendation that the commission be appointed by the President and consist of five persons—two from labor, two from employees, and the Secretary of Labor who would be the fifth member and chairman. The commission was to make a study of the causes of unemployment and to investigate methods of insurance against the hazards of unemployment, sickness, invalidity,

[34] Sometimes it is said that compulsory health insurance as a method of financing medical care was first used in the United States in 1798. At that time Congress passed a law requiring the master of every American ship arriving from a foreign port to pay the customs collector the sum of 20 cents a month deducted from each seaman's wages. This ended in 1884 when Congress directed a tonnage tax to be levied instead. In 1905 appropriations were made from the federal treasury. (Terris, Milton. "An early system of compulsory health insurance in the United States, 1798–1884." *Bull. Hist. Med.*, 1944, *15*, 433–444.)

[35] U. S. Congress. House. Committee on Labor. Hearings before the committee on H. J. Res. 159, a resolution for the appointment of a commission to prepare and recommend a plan for the establishment of a national insurance fund for the mitigation of the evil of unemployment, April 6 and 11, 1916. Washington, Government Printing Office, 1916. 306 pp. (64th Congress, First Session)

[36] U. S. Congress. House. Report No. 914. Commission to Study Social Insurance and Unemployment, July 1, 1916. To accompany H. J. Res. 250. (64th Congress, First Session)

and old age. It was further recommended that the commission report on the advisability of establishing a comprehensive federal insurance system, and if it found the establishment and maintenance of such a system practicable, to prepare and recommend rules and regulations for the administration of a national insurance system.[37] It was recognized that a number of states had already appointed commissions to study the subject, although more specifically health insurance, but that Congress should encourage study from the standpoint of the nation as a whole. The resolution came up for consideration on February 5, 1917 on the day of adjournment so that only forty minutes could be given to it. Since only 189 votes were cast in its favor, 29 votes short of the necessary two-thirds, the resolution did not pass.

During the year 1916 two members of the U. S. Public Health Service, B. S. Warren and Edgar Sydenstricker, published a study of the need for health insurance with suggestions and recommendations among which was compulsory health insurance.[38]

Late in 1917 another resolution, H. J. Res. 189, to establish a federal commission to study social insurance was introduced in the House by the same Representative who had introduced the previous resolution.[39] It was also almost identical. The resolution was reported favorably by the Committee on Labor and came up for consideration in the House on January 16, 1918. It met serious opposition and lost. That ended federal activity regarding health insurance during this period.

Action on the federal level was not very well planned. Few people were involved, only top leaders from labor, A.A.L.L., economists, government officials, statisticians, and social workers. Even the resolutions appeared vague, revealing that their authors had no clear idea as to what problems were to be investigated. Health insurance as such was somewhat obscured by the interest in the broader problems of social insurance, especially unemployment. It was a new departure for Congress to concern itself with these matters since they were traditionally problems with which the states should cope.

ORGANIZED MEDICINE

At the 66th annual session of the A.M.A. held in San Francisco, June 21–24, 1915, the Judicial Council gave a long report on workmen's compensation in the United States and abroad, also health insurance abroad and

[37] *Ibid.*, p. 2.

[38] Warren, B. S., and Sydenstricker, Edgar. *Health insurance: its relation to the public health.* 2d ed. Washington, Government Printing Office, 1916, 79 pp. (U. S. Public Health Service. Public Health Bulletin No. 76)

[39] U. S. Congress. House. Report No. 218. December 15, 1917. (64th Congress. Second Session)

possibilities for its establishment in this country. Sympathetic study was advised, and the report was referred to the Reference Committee on Reports of Officers.[40] The committee recommended that the report of the Judicial Council be accepted and also urged that the state associations should bring this question before their constituent county medical societies.[41] The Chairman of the Council was Alexander Lambert of New York City, also a member of the Committee on Social Insurance of the A.A.L.L. This was the first time that interest in health insurance was expressed by the A.M.A. in its journal.

When the California legislature empowered the appointment of the Commission on Social Insurance to study the economic problem of illness and medical care in 1915 an editorial in the *Journal of the American Medical Association* commented on the action: "The failure of many persons in this country at present to receive medical care constitutes the best argument for a change to the more effectual provision for medical attention offered by health insurance."[42] One month later the *Journal* announced the publication of the model health insurance bill drawn up by the Committee on Social Insurance of the A.A.L.L. The hope was expressed that physicians would study the bill before its introduction in the state legislature during 1916. The editorial read:

> It is hoped that physicians will take advantage of this opportunity and that it will be possible to avoid that lack of cooperation between physicians and legislators which for a time marred some of the foreign legislation. If physicians will study this important and rapidly developing problem and help to work out an equitable method of furnishing medical care and relief for working men, much dissatisfaction later can be avoided.[43]

Events moved rapidly. Immediately the Council on Health and Public Instruction of the A.M.A. appointed a committee, at the request of the A.A.L.L., to assist in drafting a health insurance bill to be introduced in the state legislatures in session in 1916. The members of the committee were Alexander Lambert(Chairman), Henry B. Favill of Chicago, and Frederic J. Cotton of Boston. The consensus was that ". . . cooperation is desirable and opportune."[44] This body became the Committee on Social Insurance and it was appointed under the power vested in the Council on Health and Public Instruction, whose chairman was Henry B. Favill, in co-operation with the Judicial Council. On February 9, 1916 the Board of

[40] Proceedings of the 66th Annual Session, American Medical Association, June 21–24, San Francisco, *J. Amer. med. Ass.*, 1915, *65*, 74–92.

[41] *J. Amer. med. Ass.*, 1915, *65*, 118–119.

[42] Editorial, *J. Amer. med. Ass.*, 1915, *65*, 1560.

[43] Editorial, *J. Amer. med. Ass.*, 1915, *65*, 1824.

[44] *J. Amer. med. Ass.*, 1915, *65*, 2247.

Trustees confirmed the appointment of the Committee and resolved:

> That the committee appointed jointly by the Council on Health and Public Instruction and the Judicial Council . . . be approved and the purpose and duties of this Committee be understood to be the careful compilation of information re social or health insurance and the relations of physicians thereto; and to do everything in their power to secure such constructions of the proposed laws as will work the most harmonious adjustment of the new sociologic relations between physicians and laymen which will necessarily result therefrom, and that this committee be authorized to carry on its work wherever seems most desirable.[45]

I. M. Rubinow, a member of the A.M.A., became executive secretary with office in New York City. According to him the committee intended to undertake the following duties:[46]

> (1) To educate American physicians in social insurance, particularly health insurance, and the "absolutely essential part which the medical profession must play in a successful adaptation of this new legislation to American conditions"; (2) To serve as a bureau of information for physicians; (3) To make statistical studies of facilities, income of physicians, and related subjects; (4) To appear before legislative bodies "to bring about friendly understanding between all parties concerned and to protect the legitimate economic interests of the profession." Further, "The work of this committee should be directed in such channels as to avoid the conflict which has arisen in England at the beginning of a similar movement and which has resulted in a very large amount of bitterness between the profession and the public that might easily have been prevented by appropriate timely action."

It is apparent that the committee was moved to action by legitimate self-interest as well as by a desire to lighten the economic burden of illness. Two months after Rubinow's report an editorial appeared in the *Journal of the American Medical Association*:

> . . . it will probably require two or three years' work to collect the necessary data and arrive at definite conclusions as to what is to be the position of the medical profession of this country in the ultimate solution of the problem. In the meantime, it is urged that individual physicians and medical organizations refrain from isolated active efforts, either for or against social insurance bills in state legislatures, in order that the attitude of the profession on this subject may be harmonious and that its influence may be exerted unitedly and effectively.[47]

As a climax to the actions and attitudes of the A.M.A., Alexander Lambert, Chairman of the Committee on Social Insurance, submitted a long report of the activities and studies of the committee to the House of Delegates at the 67th annual session of the Association held in Detroit, June 12–16, 1916. The report was referred to the Reference Committee on Legislation and Political Action, which approved it and urged that the House

[45] Rubinow, I. M. "Social insurance." *Amer. med. Ass. Bull.*, 1916, *11*, 250.

[46] *Ibid.*, p. 251.

[47] Editorial, *J. Amer. med. Ass.*, 1916, *66*, 1469–1470.

accept both the report and the committee itself.[48] Also, it was recommended that each constituent state association be requested to establish a committee on social insurance to work in conjunction with the parent committee of the national association. This the House of Delegates did.[49]

In December of the same year Lambert delivered a paper at the 10th annual meeting of the A.A.L.L. in Cincinnati, December 27–30, 1916 entitled: "Medical Organization under Health Insurance."[50] He presented a detailed and thorough plan of administering a health insurance system. Early in 1917 he published an article in the *Journal of the American Medical Association* to which the editor invited letters and reactions.[51] Sallies came from Hoffman of Prudential Insurance Company, Curtis of Insurance Economics Society, Rubinow, Andrews of A.A.L.L., and rank and file physicians, the letters continuing for several months after its publication.

At the 68th annual session of the A.M.A. held in New York City, June 4–8, 1917 the Committee on Social Insurance offered the following resolution to the House of Delegates:

> Resolved, That the House of Delegates of the American Medical Association in the interests of both the wage earners and the medical profession authorize its Council on Health and Public Instruction to continue to study and to make reports on the future development of social insurance legislation and to cooperate, when possible, in the molding of these laws that the health of the community may be properly safeguarded and the interests of the medical profession protected, and be it further
> Resolved, That the House of Delegates instruct its Council on Health and Public Instruction to insist that such Legislation shall provide for freedom of choice of physician by the insured; payment of the physician in proportion to the amount of work done; the separation of the functions of medical official supervision from the function of daily care of the sick, and adequate representation of the medical profession on the appropriate administrative bodies.[52]

The House of Delegates approved the resolution.

Because of the preoccupation with the war against Germany and pressing matters related to it, the *Journal* published little on health insurance from July 1917 until the first half of 1919. On the other hand, there was a great deal of activity on the state level as revealed in the journals of

[48] The Council on Health and Public Instruction published six pamphlets prepared by the Committee on Social Insurance. Another pamphlet was published by the Judicial Council before the committee was established. They were: (1) Workmen's compensation laws—Report of the Judicial Council in 1915; (2) Social insurance—The Committee; (3) Health insurance in relation to the public dispensary—Rubinow; (4) Health insurance in relation to the public health—Rubinow; (5) Social insurance—Rubinow; (6) Medical organization under health insurance—Lambert; (7) Statistics regarding the medical profession—The Committee.

[49] Proceedings of the Detroit Session, 67th Annual Session of the American Medical Association, Detroit, June 12–16, 1916, *J. Amer. med. Ass.*, 1916, *66*, 2081.

[50] *Amer. Labor legis. Rev.*, 1917, *7*, 36–50.

[51] Lambert, Alexander. "Health insurance and the medical profession." *J. Amer. med. Ass.*, 1917, *68*, 257–262.

[52] *J. Amer. med. Ass.*, 1917, *68*, 1755.

the state societies. The work of the Committee on Social Insurance was discontinued, as was true of the other committees of the A.M.A. The two leaders in the national organization, Alexander Lambert and Frank Billings, Chairman of the Council on Health and Public Instruction, both entered the armed services. Early in 1919 Lambert returned to the United States, and the work of the Committee on Social Insurance was resumed. The committee was reorganized, the new members being M. L. Harris, Chicago, one-time member and secretary of the Board of Trustees and at the time chairman of the Judicial Council, S. S. Goldwater, New York, and Frederick Van Sickle of Olyphant, Pennsylvania. Lambert was still chairman and also president-elect of the A.M.A. Frank Billings became a member of the Board of Trustees. Arthur D. Bevan, President of the A.M.A., 1918–1919, was reported as favoring health insurance.[53] This was also reported of Rupert Blue, Surgeon General of the United States Public Health Service and President of the A.M.A., 1915–1916.[54]

At the 70th annual meeting of the A.M.A. held in Atlantic City, June 9–13, 1919 Lambert presented to the assembled delegates on the first day a report which was accepted by the committee and then by the House of Delegates: "Our committee heartily commends Dr. Lambert's committee in their refraining to make any definite recommendations at this time."[55] The Reference Committee on Legislation and Political Action tabled a resolution against compulsory health insurance introduced in the House of Delegates by a delegate from New York in view of the favorable action taken on Lambert's report, ". . . the evidence for and against is far from complete."[56] The reaction to the activities of the national association on the part of the state associations was becoming evident. Victor C. Vaughan, Chairman of the Council on Health and Public Instruction and Dean of the School of Medicine, University of Michigan, in his report to the House of Delegates said:

> The attitude of the majority of physicians to date has been one of unqualified and often unreasoning opposition, without any effort to study the question or to consider the arguments put forward in favor of the proposed plan. Unreasoning opposition or sweeping and often erroneous general arguments against the measure will not prevent its adoption nor will it enhance the influence of the physicians. It is of the utmost importance to the medical profession at present that we give this question the most careful, painstaking, patient and disinterested study, that we qualify ourselves as authorities instead of allowing this function to be exercised by the active proponents of social insurance.[57]

[53] *Amer. Labor legis. Rev.*, 1918, *8*, 324.
[54] *Ibid.*
[55] *J. Amer. med. Ass.*, 1919, *72*, 1832.
[56] *Ibid.*, p. 1836.
[57] *Ibid.*, p. 1750.

By the time of the annual session held in New Orleans, April 26–30, 1920 the reaction of the state societies to the top officials of the A.M.A. broke out into the open. In the meantime two items appeared in the *Journal of the American Medical Association* concerning activities in Illinois and New York. The Illinois Commission on Social Insurance released its report in August 1919, and the *Journal* had the following to say about it: "The report . . . affords a most valuable study of a number of medical sociological problems which should be read with interest by every physician who is interested in the social aspects of his profession."[58] And in connection with the health insurance bill introduced in the New York state legislature with the backing of Governor Alfred E. Smith the *Journal* published this editorial comment:

> As New York is one of the oldest and most highly developed states industrially, commercially and socially, it is an ideal state in which to discuss and test out this important subject. The limitations of the discussion to the legislature of one typical state will enable the opponents and advocates of health insurance to concentrate their energies to the best advantage.[59]

The plea for an objective appraisal was to no avail. A small but powerful group of delegates, particularly from New York, Michigan, Illinois, and California, went to the New Orleans session "to get Lambert," as they put it. In answer to the growing opposition to health insurance and the part the national association had played to date, Victor C. Vaughan, reporting to the House of Delegates, observed:

> The House of Delegates has not as yet seen fit to commit the Association to any positive position on this question, evidently feeling that the time had not yet come for the Association going on record either for or against social insurance. Members of the House of Delegates, of course, understand that the House of Delegates is the only body under the Constitution and By-Laws of the Association that has any power or authority to adopt any policy or commit the Association to any opinion on this or any other question. Its determination lies entirely outside the jurisdiction of the Council. Evidently this fact is not clearly understood by many of our members, inasmuch as in the last few months statements have appeared in several of our state journals either in the editorial or correspondence columns criticizing the Council (on Health and Public Instruction) for failure to take a positive position against social insurance. Such criticism, of course, is entirely unwarranted as it is not the function of the Council to formulate the policies of the Association.[60]

In his presidential address, Lambert made no mention of the issue of health insurance. At the same session, however, the House of Delegates did establish a policy which has not been revised to the present day. Its tone in-

[58] *J. Amer. med. Ass.*, 1919, *73*, 696.

[59] Editorial, *J. Amer. med. Ass.*, 1919, *73*, 1774.

[60] *J. Amer. med. Ass.*, 1920, *74*, 1241–1242.

dicates the intensity of the reactions of the state societies. The Reference Committee on Hygiene and Public Health recommended that the following resolution be adopted:

> RESOLVED, That the American Medical Association declares its opposition to the institution of any plan embodying the system of compulsory contributory insurance against illness, or any other plan of compulsory insurance which provides for medical service to be rendered contributors or their dependents, provided, controlled, or regulated by any state or the Federal government.[61]

The House approved the resolution. In addition, the Reference Committee recommended that the House of Delegates empower the Council on Health and Public Instruction "to investigate the relative adequacy of medical services and relations of the profession to the Public and report at the next annual session." The House did so and the following year a committee was appointed for this purpose consisting of Hugh Cabot, Frank Billings, and Hermann Biggs.

As an indication of the bitter feeling among the members of the A.M.A. at the annual meeting of the House of Delegates a year later in Boston, June 9, 1921, a circular was distributed attacking Frank Billings, member of the Board of Trustees and past chairman of the Council on Health and Public Instruction, for allegedly favoring health insurance in 1916. The circular was inspired by E. H. Ochsner, Chicago. Billings answered that since 1916 he had made many statements in opposition to health insurance. The result was that the House of Delegates took official cognizance of the matter by expressing complete confidence in Billings.[62] Thus ended the first period of the health insurance movement as far as the A.M.A. was concerned, but some recapitulation is necessary to show the actions and attitudes of the state societies more clearly.

It was not until 1916 that some of the state associations—California, Massachusetts, and New York—began to take cognizance of the agitation for health insurance. Their reception of the idea was generally one of acceptance or a desire to know more about it before deciding one way or the other. During this time the New York State Medical Association opened its journal to an airing of the subject both for and against. In fact, the journal carried an editorial favorable to health insurance early in the year.[63] Also, although it may merely represent the isolated opinion of a single individual, it is significant that as prominent a physician as the secretary of the New York State Board of Medicine, Dr. Otto V. Huffman, advocated

[61] *Ibid.*, p. 1319.
[62] *J. Amer. med. Ass.*, 1921, *76*, 1757–1758.
[63] Editorial, *N. Y. St. J. Med.*, 1916, *16*, 105.

compulsory health insurance at a meeting of the Federation of State Medical Boards of the United States held in Chicago, February 8, 1916.[64] Another New York physician felt that the physicians generally favored health insurance, and that such legislation was inevitable.[65]

The results of a questionnaire sent by Eden V. Delphey of New York City to all the secretaries of state medical societies in the United States more likely reveals the true state of mind of the profession in regard to health insurance at that time. The paper was read at a meeting of the Committee on Economics of the Medical Society of the State of New York in New York City on November 23, 1916. The questions and answers were as follows:[66]

(1) Has the matter of compulsory or any other kind of health insurance ever been formally brought before your state society? *Answer:* yes, 9; no, 23. (2) Has your society ever taken any action pro or con regarding it? *Answer:* favorable, 2; committees, 6; no, 24. (3) Did your state society instruct its delegates to the A.M.A. annual meeting held in Detroit, June 12–16, 1916 either pro or con regarding health insurance? *Answer:* no, 32. (4) Do you know what the sentiment of the medical profession in your state is regarding health insurance? *Answer:* favorable, 2; unfavorable, 4; doubtful, 1; sub judice, 1; don't know, 24. (5) Do you consider the second "tentative draft" (of the model health insurance bill) issued by the American Association for Labor Legislation to be just and fair to the medical profession? *Answer:* yes, 3; no, 5; doubtful, 1; don't know, 23. (6) What would you consider to be the best form of health insurance, providing health insurance is inevitable? *Answer:* By employer, employee, and state, 2; like compensation insurance, 1; free choice, good compensation, 1; don't know, 28.

After this display of lack of knowledge and interest in the subject the paper ended with: "We are not yet ready to say just what is the best law to enact and we believe that we should carefully study the subject for some time to come before we can arrive at a proper solution of the problem."[67]

In 1917 the medical profession in the state of New York was divided as to its attitude toward the health insurance bill then in the state legislature. Samuel J. Kopetzky, New York, Chairman of the Committee on Economics of the state association, expressed himself in favor early in the same year.[68] Alexander Lambert was also a prominent member of the state association. The council of the state association had endorsed the bill. The reaction of the county associations was immediate, but not entirely unani-

[64] *Bull. Public Affairs Information Service.* 2nd Annual Cumulation, 1916, p. 136.

[65] Wile, Ira S. "Health insurance from the standpoint of the physician." *N. Y. med. J.*, 1916, *104*, 1050.

[66] Delphey, Eden V. "Compulsory health insurance from the point of view of the general practitioner." *N. Y. St. J. Med.*, 1916, *16*, 601–604.

[67] *Ibid.*, p. 602.

[68] Kopetzky, Samuel J. "Comments on the arguments of Mr. William Gale Curtis." *N. Y. St. J. Med.*, 1917, *17*, 78–81.

mous. Many passed resolutions.[69] By 1920 there was no mistaking the opposition of the organized profession in New York to health insurance. One expression of opinion, although extreme, reveals the temper of the opposition:

> Conceived in iniquity, nurtured on hypocrisy, struggling for deliverance at the frantic behest of socialistic doctrines, compulsory health insurance should die aborning. Nowhere has the swinish greed of the debasing propaganda of state socialism been more brazenly exposed than in this merciless attempt to steal the livelihood of the most unselfish profession in the world.[70]

In 1918 members of the state association testified against the health insurance bill then under consideration in the state legislature. The association had appointed a committee to study compulsory health insurance. The final report to the House of Delegates showed a large majority in opposition. A minority report of one favored the framing of a sound health insurance law, rather than merely opposing the enactment of an unsatisfactory measure. The House of Delegates went on record early in 1920 as unqualifiedly opposed to compulsory health insurance.[71]

In Massachusetts a committee appointed by the Council of the Massachusetts Medical Society in June 1916 drafted a set of minimum conditions to be incorporated in the proposed bill in that state, such as free choice of physician, fee-for-service method of payment, maternity benefit, and physician representation.[72] However, no further action came from the profession in Massachusetts. The issue was not pressing.

California presented a possibility for the enactment of a health insurance law. The journal of the state association felt that there was no doubt as to its inevitability.[73] The state association and the San Francisco county association each appointed a committee on health insurance in 1916. The committee in the state association expressed hope in a report to the association that the legislature would grant further life to the Social Insurance Commission with an adequate appropriation to carry on a more intensive study of social insurance. However, "Your committee . . . would state that under present conditions, and at least until the war is over, and until

[69] Dutchess-Putnam Medical Society, opposed; Richmond County Medical Society, opposed on administrative grounds; Medical Society of the County of Erie, opposed; Medical Society of the County of Washington, opposed; Medical Society of the County of Schenectady, opposed; Broome County Medical Society, if health insurance is inevitable we should cooperate and ask for the best items; Medical Society of the County of Cayuga, opposed. (*N. Y. St. J. Med.*, 1917, *17*, 154–156.)

[70] Cunningham, W. P. "Health insurance." *N.Y. med. J.*, 1917, *106*, 683.

[71] "Attitude of the Medical Society of the State of New York toward compulsory health insurance." *Labor Rev.*, 1920, *10*, 255.

[72] "Workmen's sickness insurance and the doctor." *Boston med. surg. J.*, 1916, *175*, 880–881.

[73] *Amer. Labor legis. Rev.*, 1916, *6*, 277.

more data on the subject are available, this Society should strenuously oppose all Health Insurance bills."[74] The opposition was intense. Much of it was carried on through the League for the Conservation of Public Health made up of members of the medical profession. Many pamphlets were released identifying health insurance with the German Kaiser and "Teutonic tyranny." Over ten years later a California physician wrote in retrospect that the bill proposed in California "was a good one, as such laws go, and yet its approach was exceedingly tactlessly handled. It was born of propaganda, bred and spread by a man of Russian name. It developed without any organized effort to win over the leaders in the medical profession."[75]

Bitter opposition also emerged in Illinois, Michigan, and Pennsylvania. The general arguments were that labor did not want compulsory health insurance, nor the physicians, nor the employers. The only group in favor was the American Association for Labor Legislation. A vigorous opponent was Edward H. Ochsner, Chicago, who had studied medicine in Germany and had had an opportunity to observe health insurance medical practice on a limited scale. He wanted someone to explain to him on what theory of justice those who live clean moral lives should be taxed to pay for the loss of time and doctor bills for illness very largely brought on by the imprudent lives of others.[76]

The A.A.L.L. was attacked from many quarters. The members of the Association were called "up-lifters," "do-gooders," and so on. It was also claimed that the Association was not really an American organization because it was affiliated with a number of organizations of similar character in foreign countries. Furthermore, it was discovered that many of the names of members in the Association had their origin in central Europe. Although President Woodrow Wilson was a member, it was said that even he could make mistakes.[77]

Suggested alternatives to compulsory health insurance were typified by the following:[78]

(1) Increase in wages—economic remedy; (2) Public health development—public health remedy; (3) Voluntary thrift—personal remedy; (4) Voluntary industrial insurance by employees and employers—co-operative industrial remedy; (5) Development of trade union and industry benefit associations—co-operative social remedy.

[74] *Calif. St. J. Med.*, 1917, *15*, 198.

[75] Brown, Philip K. "Organized medicine's interest in a health insurance plan for small wage earners." *New Engl. J. Med.*, 1931, *205*, 1287.

[76] Ochsner, Edward H. "Further objections to compulsory health insurance." *Ill. med. J.*, 1918, *34*, 246.

[77] *J. Maine med. Ass.*, 1918, *9*, 46.

[78] Green, Frederick R. "What should be the attitude of physicians toward health insurance." *J. Mich. med. Soc.*, 1920, *19*, 280. (Secretary of the Council on Public Health of the A.M.A.)

The House of Delegates of the State Medical Society of Wisconsin endorsed health insurance and seems to be the only state society taking such action. Many prominent physicians spoke favorably of health insurance, but they were unable to influence the organized professions.[79]

INSURANCE COMPANIES

The commercial insurance companies were the first of the opposition groups to attack compulsory health insurance in 1916. They were alert to its implications and their reactions were immediate. In fact, the insurance companies thought at first that they were alone; they certainly did not anticipate the opposition of organized medicine. William Gale Curtis, President of both the Insurance Economics Society of America and the National Casualty Company, Detroit, said in an address at the convention of National Association of Casualty and Surety Agents, White Sulphur Springs, West Virginia, September 20, 1916: "The Medical Fraternity wants it (health insurance) because it will mean at least two or three times as much for medical treatment of wage earners."[80]

The Insurance Economics Society was organized by insurance companies in 1916 for the purpose of combatting compulsory health insurance. From 1916 to 1919 thirteen reports were published, none of them factual but simply expository. Most of them were written by the society's president, William Gale Curtis. One paper was prepared at the request of Royal Meeker, Commissioner of Labor Statistics, to be read before the Conference on Social Insurance, Washington, D.C., December 7, 1916. When Meeker saw it he said it would not further the purpose of the conference or help their plan for social insurance. It was a bitter diatribe about slavery, class struggle, and so on, e.g., "When Compulsory Health Insurance enters the United States, Socialism will have its foot upon the throat of the Nation."[81] Another paper of similar nature was prepared and read before the American Association for the Advancement of Science held at Columbia University, December 28, 1916.[82] The style and temper of the paper were not in keeping with the scholarly atmosphere.

After Frederick L. Hoffman resigned from the Committee on Social In-

[79] Some of them were: John F. Anderson, Senior Surgeon, U.S.P.H.S. and former President of A.P.H.A.; Richard Cabot, Massachusetts General Hospital; W. A. Evans, President of A.P.H.A.; W. C. Gorgas, Surgeon-General, U. S. Army; E. P. Lyon, Dean, Medical School, University of Minnesota; Harry E. Mock, President of A.A. of I.P.S.; James P. Warbasse.

[80] Curtis, William Gale. "Social insurance." *Insurance Economics Society of America.* Bulletin No. 1 (1916), p. 14.

[81] *Insurance Economics Society of America.* Bulletin No. 2.

[82] Lott, Edson S. "Fallacies of compulsory social insurance." *Insurance Economics Society of America.* Bulletin No. 6.

surance of the A.A.L.L. in 1916, he wrote and lectured extensively against compulsory health insurance. In addition to being a statistician for the Prudential Insurance Company of America, he was a member of statistical associations both in the United States and abroad, and of the American Association for the Advancement of Science. He addressed many medical societies and business and citizens' groups. In one of his early publications he stated that health insurance had not benefited Germany because the suicide rate in Berlin rose from 2.3 per 10,000 in 1900 to 3.8 in 1913, while in the Bronx and Manhattan it decreased from 2.4 to 1.8 during the same period.[83] Since his company was based on voluntary thrift, Hoffman wrote:

> In its final analysis all social and economic progress depends primarily upon the highest and most effective development of the voluntary thrift function in the form of savings, investments and insurance, and in appreciation of the truly enormous social service rendered the State by life insurance institutions, it requires no argument to sustain the conclusion that there should be the utmost solicitude on the part of the Government towards established methods of insurance protection and relief from needless and burdensome taxations, so that the best possible economic results may be realized in response to the exercise of the highest form of altruism, which reflects the true civilization of the present time.[84]

In addition he suggested provision of medical care for the poor, increased facilities for all, provisions for occupational diseases, better sanitation, nutrition, and so on. He felt that in the average American wage earners' families the standard of living was sufficiently high so that the risk of prolonged illness was relatively small.

Then came World War I, and Hoffman and others had more ammunition with which to warn the country against compulsory health insurance. It was "made in Germany"; there was alleged to be insidious German propaganda in this country for its adoption.[85] Hoffman thought that industrial insurance companies might more justifiably claim to represent the American working people than those who deal with them at a distance and frequently without personal knowledge of the conditions which they feel are so urgently in need of reform.[86] In 1919 Hoffman spent the summer and fall in Great Britain studying the health insurance system in

[83] Hoffman, Frederick L. *Facts and fallacies of compulsory health insurance.* Newark, N. J., Prudential Insurance Company of America, 1917, p. 50.

[84] *Ibid.*, p. 99.

[85] Hoffman, Frederick L. "Failure of German compulsory health insurance—a war revelation." In: Proceedings of the 12th Annual Meeting of the Association of Life Insurance Presidents, New York City, December 5–6, 1918, pp. 121–142.

[86] Hoffman, Frederick L. "Health insurance and the public." *Penn. med. J.*, 1919, *22*, 664. In 1917 there were 37,468,776 industrial policies in force in 22 companies.

that country and published a short book on it.[87] Thereafter the activity of the insurance companies ceased since the agitation for health insurance had subsided.

Pharmaceutical Companies

The protagonists of health insurance failed also to anticipate and to estimate the opposition of pharmaceutical companies. One of the first actions to come from this group was a resolution against compulsory health insurance passed in May 1917 by the Detroit branch of the American Pharmaceutical Association.[88] In August of the same year the national association at its 65th annual convention held in Indianapolis, August 28–September 1, 1917, passed a similar resolution.[89] By 1918 the American Pharmaceutical Association had appointed a Committee on Compulsory Health Insurance which reported to the 66th annual meeting held in Chicago, August 14–16, 1918. The report stated in a surprised manner:

> . . . It has recently been discovered that the whole propaganda originated in Germany. During the years prior to the present war Germany was out after world trade. She was ambitious to conquer international markets. The great stumbling block was American competition. How can she lessen it? One brilliant method would be to foist compulsory health insurance on the United States and thus greatly increase the national cost of production.[90]

It can be seen that neither the times nor the issue were conducive to a calm analysis. Other pharmaceutical groups such as the National Association of Retail Druggists and American Drug Manufacturers' Association opposed health insurance. The pharmacists expressed fear that hospital dispensaries would be used if a compulsory health insurance system were enacted.[91]

Business

In the beginning of the discussion of compulsory health insurance the impression is created that business organizations such as the Chamber of Commerce and the National Association of Manufacturers looked favorably on health insurance although they had not gone very deeply into the subject. In a short time, however, especially in New York state, business aligned itself with the opposition. An interesting sidelight is given in communications from the Berlin office of the American Chamber of Com-

[87] Hoffman, Frederick L. *National health insurance and the medical profession.* Newark, N. J., Prudential Insurance Company of America, 1920, 122 pp.

[88] *J. Amer. pharm. Ass.*, 1917, *6*, 569.

[89] *J. Amer. pharm. Ass.*, 1917, *6*, 1081.

[90] *J. Amer. pharm. Ass.*, 1918, *7*, 900.

[91] Beal, J. H. "Concerning proposed compulsory health insurance legislation." *J. Amer. pharm. Ass.*, 1917, *6*, 701–711; Mason, Harry B. "What compulsory health insurance would mean to the druggist." *Ibid.*, 1917, *6*, 881–890; Editorial, *Nat. Ass. Retail Druggists J.*, 1918, *25*, 1018.

merce, one of which reads: "Compulsory workmen's insurance has raised the working classes in Germany in respect to health, economy and standing in the community, and it is clear that, with their aid only, Germany has maintained her position in the markets of the world."[92] In May, 1916, the National Association of Manufacturers reported favorably on compulsory health insurance, [93] but the next year the Committee on Industrial Betterment of the N.A.M. reported a preference for voluntary health insurance.[94] Gradually the opposition became more pronounced.

The National Civic Federation, comprising representatives of employers, top labor leaders, and citizens, was active in opposing compulsory health insurance during this period, particularly in New York. A much publicized meeting was held in New York City with many speakers, among them Samuel Gompers, urging defeat of legislation. The Federation sent a committee to study health insurance in Great Britain. The preliminary report was adverse.[95]

In 1918 the National Industrial Conference Board published a study of health insurance with vague and noncommittal recommendations about the desirability of studies of the incidence of illness and its causes, with suggestions of programs for both preventable and unpreventable illnesses.[96]

Organized Labor

The greatest surprise of all to the protagonists of compulsory health insurance was the divided stand, if not the outright hostility, of organized labor. Individual labor leaders came out in favor of health insurance in many instances, but the most outstanding leader, Samuel Gompers, longtime president of the American Federation of Labor, was until his death in 1924 adamant against any kind of government social insurance. There was no unanimity within the executive hierarchy of the A.F. of L., but Gompers' prestige and influence appeared effective in forestalling favorable action.[97] Twenty-one state federations of labor supported it, the most notable one being the New York State Federation of Labor, but its support was not secured until the proposed legislation of 1918.[98] In addition, twenty-nine

[92] Bulletin of the American Chamber of Commerce in Berlin, December, 1915. Quoted in *Amer. Labor legis. Rev.*, 1916, *6*, 181.

[93] *Amer. Labor legis. Rev.*, 1917, *7*, 11.

[94] *Amer. Labor legis. Rev.*, 1917, *7*, 694.

[95] Simpson, Thomas H. "Compulsory health insurance." *Review of Reviews*, 1917, *55*, 416.

[96] National Industrial Conference Board. Research Report No. 6. *Sickness insurance or sickness prevention?* Boston, The Board, 1918, 24 pp.

[97] The following officers in the A.F. of L. favored health insurance: James Duncan, First Vice-President; John B. Lennon, Treasurer; James O'Connell, Second Vice-President. (*Amer. Labor legis. Rev.*, 1916, *6*, 203).

[98] American Association of Labor Legislation. "Report of Work, 1919." *Amer. Labor legis. Rev.*, 1920, *10*, 74.

national trade unions expressed themselves in favor.[99] Two well-known students of labor and economics stated that, except for New York state, organized labor had not studied the subject long enough to have committed itself either for or against compulsory health insurance. They felt that the official attitude of individual unions, as expressed in the form of resolutions, sometimes depended on the opinion of whoever happened to present the resolution.[100] Of course, this may not have been peculiar to organized labor alone.

Samuel Gompers' viewpoint is expressed in his declamation at the hearings before the House Committee on Labor in reference to H. J. Res. 159 (1916) to establish a federal commission to investigate social insurance:

> I am apprehensive that the attempts of government under the guise of compulsory social insurance for workers in cases of unemployment, sickness, and disability will result in every Government agent going into the homes and the lives of the workers as a spy. We have enough already of spies and detectives coming into the lives and workshops of the toilers. After centuries of struggles, during the past 20 years we concentrated our efforts in an agitation that has gone through the whole country to secure from the hands of Congress a larger liberty of action than has ever been accorded to the working people of any other country on the face of the globe in the entire history of the world. After years of struggling to secure these things we are not going to let go, we are not going to submit. As I live, upon the honor of a man, and realizing the responsibility of my words, I would rather help in the inauguration of a revolution against compulsory insurance and regulation than submit. As long as there is one spark of life in me, of my mentality, whatever that may be, of my spirit, I will help in crystallizing the spirit and sentiment of our workers against this attempt to enslave them by the well-meaning siren songs of philosophers, statisticians, and politicians.[101]

There is little doubt that he succeeded during his lifetime. The prevailing trade union ideology was higher wages with which they would solve their own problems arising from illness.

William Green, then secretary-treasurer of the United Mine Workers of America, on the other hand favored compulsory health insurance.[102] Matthew Woll would have been inclined to favor it if such a system could be maintained by general taxation, as is true of the public schools, rather than by the wages of the laborer, and if the system would provide all necessary medical services and free choice of physician.[103] Woll evidently feared a continuation of charity medicine in a health insurance system for wage earners.

[99] *Ibid.*

[100] Commons, John R., and Altmeyer, Arthur J. "The health insurance movement in the United States." *In:* Illinois. Health Insurance Commission. Report, May 1, 1919. Springfield, Illinois, The Commission, 1919, p. 637.

[101] U. S. Congress. House. Committee on Labor. *Op. cit.*, p. 185.

[102] Green, William. "Trade union sick funds and compulsory health insurance." *Amer. Labor legis. Rev.*, 1917, *7*, 91–95. Read at the 10th annual meeting of A.A.L.L.

[103] *Amer. Labor legis. Rev.*, 1918, *8*, 193.

The reluctance of the American Federation of Labor to take any action whatever is apparent in its deliberations at the annual conventions. The first time any interest in health insurance was indicated by the Executive Council was at the 38th annual convention held in St. Paul, June 10–20, 1918. The appointment of a health insurance investigating committee was authorized to look into the matter and recommend a course of action. But the suspicious tone of the recommendation for the formation of the committee indicated the feeling of the Executive Council as to health insurance even before the committee was appointed:

> WHEREAS, During the past few years great efforts have been made to obtain the approval and support of organized labor to a scheme for Social Health Insurance, promoted by persons and organizations who have no affiliation with the Labor movement; and WHEREAS, Owing to the intensive and costly campaign which the promoters of this scheme have carried on during the past two years, at one time seeking to have this legislation adopted in twenty-eight different states, suspicion has been aroused that this scheme is supported by those who, for years, have sought to disrupt and retard the cause of the workers. . . .[104]

To whom was this directed? Apparently socialists, intellectuals, social workers, economists, politicians, and others were the target. Labor as represented by the trade unions was suspiciously aloof.

In 1919 the Executive Council decided to continue its study of health insurance before the Federation would declare its position.[105] A year later the council still found itself unable to reach unanimous agreement upon the subject of voluntary health insurance and trade union health insurance on the one hand as against compulsory state or industrial health insurance on the other. It was then recommended that the entire subject be referred to a committee to be selected by the Executive Council and that the members of this committee be representative of both sides.[106] Their findings were to be submitted to the convention to be held in 1921. When the 41st annual convention was held in 1921 the committee still had not made a report, but its work was to be continued.[107] The subject was not mentioned at the convention held in 1922 in Cincinnati; by that time health insurance was a dead issue anyway.

AMERICAN HOSPITAL ASSOCIATION

The American Hospital Association appointed a Committee on Social Insurance under the chairmanship of Dr. Thomas Howell, Superintendent

[104] American Federation of Labor. Proceedings of the 38th Annual Convention, St. Paul, Minnesota, June 10–20, 1918, pp. 282–283.

[105] American Federation of Labor. Proceedings of the 39th Annual Convention, Atlantic City, New Jersey, June 9–23, 1919, pp. 378–379.

[106] American Federation of Labor. Proceedings of the 40th Annual Convention, Montreal, June 7–19, 1920, pp. 176, 387.

[107] American Federation of Labor. Proceedings of the 41st Annual Convention, Denver, June 13–25, 1921, pp. 310–311.

of the New York Hospital, New York City. He favored the action of the Association at its 20th annual conference at Atlantic City, September 24–28, 1918, during which time health insurance was unanimously endorsed.[108] The Legislative Committee recommended the endorsement of health insurance on the ground that under workmen's compensation the hospitals had not been consulted as to the probable cost of hospital care. As a result hospitals were being paid for the care of workmen's compensation cases at rates much below the actual cost. It was hoped that this condition would be rectified in the adoption of compulsory health insurance, and the Association offered to advise and co-operate with the state health insurance commissions and state legislatures in drawing up bills. However, except for the official endorsement the American Hospital Association did little else in this matter.

NURSING

In 1916 three organizations of nurses appointed a joint Committee on Health Insurance. The organizations represented were the National League of Nursing Education, National Organization for Public Health Nursing, and the American Nurses' Association. The committee reported favorably on health insurance and recommended that nursing organizations and individual nurses study the subject.[109] And Mary Beard, in her presidential address to the Fifth Annual Convention of the National Organization for Public Health Nursing in 1917 said: "We must set our house in order against the day when nursing under health insurance acts will be ours to administer."[110]

PUBLIC HEALTH

The public health profession, i.e., the state and county health officers, was confronted with the problem of the administration of health insurance. Their top administrator, Surgeon General of the U.S. Public Health Service Rupert Blue, favored compulsory health insurance in 1916, and B. S. Warren, Surgeon in the Service, was an active proponent. Warren saw the administrative problems of public health departments as early as 1915 when he suggested that for disability compensation, physicians engaged by the government agency should do the certifying. These physicians could also be the health officers, thereby linking up preventive and curative medicine.[111]

[108] American Hospital Association. 20th Annual Conference, Atlantic City, New Jersey, September 24–28, 1918, Vol. 20, pp. 11, 150.

[109] Twentieth Annual Convention of the American Nurses' Association, Philadelphia, April 26–May 2, 1917. *Amer. J. Nurs.*, 1917, *17*, 864–866.

[110] *Public Health Nurse Quarterly*, 1917, *9*, 213.

[111] *Amer. Labor legis. Rev.*, 1916, *6*, 28–31.

In any case, at a conference of the U.S. Public Health Service and the health officers of the states and territories held in Washington May 13–15, 1916 at which twenty-three states and territories were represented, a resolution was unanimously passed adopting the report of its committee on health insurance favoring the establishment of compulsory health insurance.[112]

Others

In New York state and also in other states where health insurance had not become as pressing an issue there was widespread editorial support by many newspapers.[113] For example, as prominent a daily newspaper as *The New York Times* wrote:

> That employers and the state should each contribute toward the health insurance of workers is economically sound and "good business." Both employers and the state, as well as the workers, profit by its results, and, after all, such insurance is only doing systematically and intelligently what is done by the old methods irregularly and to a considerable degree blindly, with much duplication of efforts and much waste of money.[114]

And the *Boston Post* said: "It would seem reasonable to infer that both the medical profession and the people have much to gain and nothing to lose by adopting compulsory sickness insurance."[115]

Numerous social workers, economists, and statisticians declared themselves in favor of health insurance, among them Jane Addams, Edward D. Devine, Lillian D. Wald, John A. Ryan, and Henry R. Seager. Likewise many public officials lent their names to the cause: William E. Borah, Julia Lathrop, Theodore Roosevelt, Hiram Johnson, and Alfred E. Smith.

No national social welfare organization such as the National Conference of Social Work took official action. The only apparent action on a local level was that of the Social Welfare Conference of Buffalo, New York, in the form of a resolution favoring health insurance on February 16, 1916.[116]

As for citizens' groups, the only evidence that could be found regarding attitudes and action was the endorsements of the New York health insurance legislation in 1918 by state organizations. Health insurance activity had developed far enough in this state so that citizens' groups became interested. These organizations were: National Consumers' League, Y.W.C.A., New York State Federation of Women's Clubs, and New York Suffrage Association.[117] But it is interesting to note that no action was taken by these

[112] *J. Amer. med. Ass.*, 1916, *67*, 832.

[113] Some of the more prominent ones were: *New York Times, Springfield (Mass.) Republican, New York Tribune, Buffalo News, New York Herald, San Francisco Chronicle.*

[114] *N. Y. Times*, April 10, 1916.

[115] *Boston Post*, February 13, 1916. Quoted in *Amer. Labor legis. Rev.*, 1916, *6*, 173.

[116] *Amer. Labor legis. Rev.*, 1916, *6*, 174.

[117] *Amer. Labor legis. Rev.*, 1918, *8*, 317.

groups until health insurance had been the concern of the state legislature for the third successive legislative session.

Analysis of the Period

At the turn of the century there were many intellectuals interested in the workingman and the social and economic problems of an industrial nation. The intellectuals, as stated by Perlman, were "beginning to be manufactured in quantity by the graduate schools of the universities, by the 'social settlement' homes, and by other 'social service' institutions."[118] Perlman's concept of intellectuals was fairly broad and included economists, sociologists, social workers, and those of related professions requiring academic training who were not members of organized labor. It was this group which made up the membership of the A.A.L.L. and formed the spearhead for agitation for workmen's compensation and, later, health insurance, not to mention their efforts to improve working conditions, raise wages, and so on during the same period.

Why did they fail? A review of the events and attitudes of the period depicted above should provide the answers, at least tentatively. One factor which may be important is Perlman's conclusion from studying reform movements in Europe and in the United States—that the intellectuals leading these movements always underestimated the strength of the vested interests.[119] He feels that they tended to think in terms of abstract social forces such as "labor" and "capital" moving through history as opponents in an inevitable dialectic in which the oppressed emerge victorious. Furthermore, organized labor in America distrusted the intellectuals.

It is true that the A.A.L.L. did not anticipate the vehement opposition of the medical profession in view of the apparent early co-operation of top leaders in the A.M.A. The attacks by commercial insurance were entirely unexpected since this group was not even selling health insurance at the time. It apparently had not seen the commercial possibilities of health insurance until the A.A.L.L. submitted its "standard bill." The inclusion of funeral benefits was a tactical error because of its implied threat to industrial life insurance. An unexpected assault came from the Christian Scientists and other secondary practitioners who saw in health insurance an attempt of scientific medicine to eliminate medical cults. But most disheartening of all was the indifference, for the most part, of organized labor.

Perhaps the movement for health insurance developed too rapidly

[118] Perlman, Selig. *A theory of the labor movement*. New York, Macmillan, 1928, p. 179.

[119] *Ibid.*, p. 151.

after the quick success of workmen's compensation. Workmen's compensation went through the several standard stages in the development of a successful social movement, but in health insurance there was an attempt to graft the final stages of the movement—policy-making and determination of administrative methods—onto the first stages of the workmen's compensation movement—social unrest and popular demand.

The issue and problems in workmen's compensation and health insurance were quite different, however. Workmen's compensation grew out of a long recognized need in industry for the alleviation of the economic risk to the worker of accidents and illnesses rising out of employment and over which he had no control. Furthermore, workmen's compensation did not spring forth full blown but was a refinement of the old concept of employer liability. But perhaps even more important still, workmen's compensation involved only cash compensation for certain defined contingencies. Health insurance, on the other hand, involved services and thereby would entail the organization and co-ordination of physicians, hospitals, drugs, and related services. The problem which workmen's compensation was supposed to meet was much more easily defined than health insurance and was socially and economically acceptable at the time. It was right that society or at least industry should charge to overhead the illnesses and accidents incurred by workers while at work. No such justification, except in a vague way, could be brought forward for health insurance. The individual and family should be thrifty and save for the contingencies of illness, and it was assumed that people had some degree of control over their health by leading prudent and moral lives.

In retrospect, I. M. Rubinow in an address before a combined annual meeting of the A.A.L.L. and the American Sociological Society at Cleveland, Ohio, December 31, 1930, tried to determine the causes for the failure of the health insurance movement in 1920. He felt that in both workmen's compensation and health insurance extravagant promises were made by proponents and exaggerated dire results were predicted by opponents and he said wistfully:

> It might have been unnecessary to make those promises, if it had been possible for each economic group clearly to formulate its own interest in legislation, and if the legislative process were a simple equation of definite, measurable, recognized group influences. In other words, these things would have been possible if the process of legislation were only a process of social accounting and not colored by numerous psychologic attitudes and rationalizations.[120]

[120] Rubinow, I. M. "Public and private interests in social insurance." *Amer. Labor legis. Rev.*, 1931, *21*, 184.

These were the last remarks in print of the foremost "intellectual" of the first period of health insurance. His statement of the problem shows far more insight than his strategy in bringing about reform.

An article in the *New Republic* gives further insight into the tangled welter of that period and one of the possible reasons for the failure of the health insurance movement. It indicates that the necessary division of labor in a social movement had not crystallized sufficiently. Social types had not found their proper niches. The article reads:

> When historians of the future come to examine the origins of the movement for social advance that gives the present (1916) its distinction, they doubtless will be impressed by the antithetical impulses that generated our enthusiasm for reform. They will find the passion of the humanitarian yoked with the zeal of the scientist; the sentimentalist and the rationalist fighting side by side against the established order. Rebellion born of pity joins hands with rebellion born of exact knowledge and clear analysis. It matters little that one sees the enemy as injustice and suffering, the other as stupidity and waste. Pseudo-science may bring down on its head imprecations of humanitarianism; scientists may curse the "insane fringe" of the army of sentiment. But the two forces work together.[121]

If the scientists had really used the "sentimentalists" to whip up feeling on an agitational level, perhaps the "logical" intellectuals would have carried health insurance through to a successful conclusion. After lying dormant until 1933, at which time the Committee on the Costs of Medical Care published its final report, health insurance re-emerged as part of the general social security movement culminating in the Social Security Act of 1935. Health insurance was not part of the Act, but a more stable springboard was thereby provided. Health insurance has again been a very live issue during the last ten years, but in a very different social, economic, and political context from that of 1910–1920—so different that the two periods have little direct relation.

BIBLIOGRAPHY

For the sake of brevity specific references are not given for annual conventions of organizations and annual reports of government agencies. Only the years will be noted. Likewise, specific references to numerous and brief editorials and other items in professional journals are not listed. They are cited in the text.

Books and Pamphlets

AMERICAN ASSOCIATION FOR SOCIAL SECURITY. *The revised model health insurance bill.* New York, The Association, n. d., 16 pp.

CALIFORNIA. SOCIAL INSURANCE COMMISSION. *Report, January 25, 1917.* Sacramento, The Commission, 1917, 339 pp.

——. *Report, 1919.* Sacramento, The Commission, 1919, 132 pp.

COMMONS, JOHN R., and ALTMEYER, ARTHUR J. The health insurance movement in the United States. *In: Illinois Health Insurance Commission Report,* 1919, pp. 625–647.

[121] "A government plan for health insurance." *New Republic,* 1916, 7, 55.

HOFFMAN, FREDERICK L. *Facts and fallacies of compulsory health insurance.* Newark, N. J., Prudential Insurance Company of America, 1919. (Pamphlet)

——. *National health insurance and the medical profession.* Newark, N. J., Prudential Insurance Company of America, 1920, 122 pp.

NATIONAL INDUSTRIAL CONFERENCE BOARD. Research Report No. 6. *Sickness insurance or sickness prevention?* Boston, The Board, 1918, 24 pp.

PERLMAN, SELIG. *A theory of the labor movement.* New York, Macmillan, 1928, 321 pp.

RUBINOW, I. M. *Standards of health insurance.* New York, Holt, 1916, 322 pp.

WARREN, B. S., and SYDENSTRICKER, EDGAR. *Health insurance; its relation to the public health.* 2d ed. Washington, Government Printing Office, 1916, 79 pp. (U. S. Public Health Service. Public Health Bulletin No. 76)

Proceedings, Transactions, and Government Documents

U. S. CONGRESS. House. Committee on Labor. Hearings before the committee on H. J. Res. 159, a resolution for the appointment of a commission to prepare and recommend a plan for the establishment of a national insurance fund for the mitigation of the evil of unemployment, April 6 and 11, 1916. Washington, Government Printing Office, 1916, 306 pp. (64th Congress. First Session)

U. S. CONGRESS. House. Report No. 218. December 15, 1917. (64th Congress. Second Session)

U. S. CONGRESS. House. Report No. 914. Commission to Study Social Insurance and Unemployment, July 1, 1916. To accompany H. J. Res. 250. (64th Congress. First Session)

Signed Articles

AMERICAN MEDICAL ASSOCIATION. Committee on Social Insurance. "Social insurance." *Amer. med. Ass. Bull.*, 1916, *11*, 250–354.

BEAL, J. R. "Concerning proposed compulsory health insurance legislation." *J. Amer. pharm. Ass.*, 1917, *6*, 701–711.

BROWN, PHILIP K. "Organized medicine's interest in a health insurance plan for small wage earners." *New Engl. J. Med.*, 1931, *205*, 1287.

CHAMBERLAIN, JOSEPH P. "The practicability of compulsory health insurance in America." *Amer. Labor legis. Rev.*, 1914, *4*, 29–72.

CUNNINGHAM, W. P. "Health insurance." *N. Y. med. J.*, 1917, *106*, 683–686.

CURTIS, WILLIAM G. "Social insurance." *Insurance Economics Society of America.* Bulletin No. 1.

DELPHEY, EDEN V. "Compulsory health insurance from the point of view of the general practitioner." *N. Y. St. J. Med.*, 1916, *16*, 601–604.

DEVINE, EDWARD T. "Social insurance a live issue; the discussions last week at the Washington conference." *Survey*, 1916, *37*, 295–296.

FISHER, IRVING. "The need for health insurance." *Amer. Labor legis. Rev.*, 1917, *7*, 9–23.

GREEN, FREDERICK R. "What should be the attitude of physicians toward health insurance." *J. Mich. St. med. Soc.*, 1920, *19*, 273–283.

GREEN, WILLIAM. "Trade union sick funds and compulsory health insurance." *Amer. Labor legis. Rev.*, 1917, *7*, 91–95.

HOFFMAN, FREDERICK L. "Failure of German compulsory health insurance—a war revelation." *In:* Proceedings of the 12th Annual Meeting of the Association of Life Insurance Presidents, New York City, December 5–6, 1918, pp. 121–142.

——. "Health insurance and the public," *Penn. med. J.*, 1919, *22*, 664–671.

Insurance Economics Society of America. Bulletin Nos. 1–6, 1916–1919.

KOPETZKY, SAMUEL J. "Comments on the arguments of Mr. William Gale Curtis." *N. Y. St. J. Med.*, 1917, *17*, 78–81.

LAMBERT, ALEXANDER. "Health insurance and the medical profession." *J. Amer. med. Ass.*, 1917, *68*, 257–262.

LAPP, JOHN A. "The findings of official health insurance commissions." *Amer. Labor legis. Rev.*, 1920, *10*, 27–40.

LOTT, EDSON S. "Fallacies of compulsory social insurance." *Insurance Economics Society of America*. Bulletin No. 6.

MASON, HARRY B. "What compulsory health insurance would mean to the druggist." *J. Amer. pharm. Ass.*, 1917, *6*, 881–890.

OCHSNER, EDWARD H. "Further objections to compulsory health insurance." *Illinois med. J.*, 1918, *34*, 244–250.

Public Affairs Information Service Bulletin, 1916 and 1917.

RUBINOW, I. M. "First American conference on social insurance." *Survey*, 1913, *30*, 478–480.

——. "Health insurance: the spread of the movement." *Survey*, 1916, *36*, 407–409.

——. "Public and private interests in social insurance." *Amer. Labor legis. Rev.*, 1931, *21*, 181–191.

——. "Sickness insurance." *Amer. Labor legis. Rev.*, 1913, *3*, 162–171.

SIMPSON, THOMAS R. "Compulsory health insurance." *Review of Reviews*, 1917, *55*, 414–416.

TERRIS, MILTON. "An early system of compulsory health insurance in the United States, 1798–1884." *Bull. Hist. Med.*, 1944, *15*, 433–444.

WILE, IRA S. "Health insurance from the standpoint of the physician." *N. Y. med. J.*, 1916, *104*, 1050–1053.

Unsigned Articles

"Attitude of the Medical Society of the State of New York toward compulsory health insurance," *Labor Rev.*, 1920, *10*, 255–258.

"A government plan for health insurance," *New Republic*, 1916, *7*, 55.

"Health insurance now a practical issue," *Survey*, 1916, *35*, 691–692.

"Workmen's sickness insurance and the doctor," *Boston med. surg. J.*, 1916, *175*, 880–881.

Daniel Whistler and the English Disease
A Translation and Biographical Note

G. T. SMERDON*

TO the twentieth century pædiatrician in Britain, rickets as a fully developed clinical condition is a rare bird. In the seventeenth century, however, it was so prevalent here as to have earned itself the name of The English Disease. Syndromes resembling it had been described in various works for many centuries, but the first printed book devoted to it as a clinical entity was, appropriately enough, the work of an Englishman named Daniel Whistler. He was born at Walthamstow in 1619 and, after getting his rudiments at the Free School at Thame in Oxfordshire, went up to Merton College, Oxford, as a Probationer-fellow in 1639. After proceeding B.A. in 1642 he went to study medicine at Leyden, where he presented the *De morbo puerili Anglorum* as an M.D. thesis in 1645. With the exception of a short trip to Oxford in February 1644 to take his M.A., he seems to have remained in Leyden during the whole of those three years.

In 1647 he was incorporated D.M. at Oxford and, perhaps on the recommendation of William Harvey, who was now Warden of Merton, was elected "Superior Reader of Linacre's Lecture." Like many another Oxford physician, however, he already had an eye on the wider world of London; for in 1647 we find him a candidate at the College of Physicians and next year, despite his Linacre Lectureship which he had not yet resigned, he became Professor of Geometry at Gresham College. In 1649 there followed the honour of a Fellowship of the Royal College of Physicians.

By 1652 he was clearly cutting something of a figure in London and was appointed to take charge of seamen wounded in the war with Holland. In 1653 he accompanied Cromwell's Ambassador, Bulstrode Whitlocke, on a mission to Sweden. Apart from his duties as physician to the Embassy, he seems to have tried his hand at diplomacy. In one of his letters to the Protector (Thurloe, State Papers II, p. 204) he discusses the rumoured abdication of the Queen of Sweden with a little court gossip for good measure. Here for the first time we get a glimpse of him as an urbane and accomplished man of society, with a firm command of elegant diplomatic French

* The Radcliffe Infirmary, Oxford, England.

and the capacity to turn out a set of pretty Latin verses to meet a state occasion.

In July 1654 he returned to London practice in the parish of St. Helen's, Bishopsgate. Two years later he had the wisdom to marry Elizabeth Lowther of Little Tilford in Essex, a widow with a substantial estate from her previous husband. From this time forth the Whistlers' fortunes were secure. Wood gives it as his opinion that, in addition to this dowry, the Doctor's annual income from his practice was seldom less than £1,000 a year for many years before his death.

About this time, too, he began to be a force in the Councils of the College of Physicians. In 1659 he delivered the Harveian Oration and was twelve times Censor, Registrar for eight years, Elect in 1676, and Treasurer in 1682. On the removal of President Coxe, who made the mistake of being "Whiggishly inclin'd," he became President in 1683. He had already been living for eight years in the College House, built by Sir George Ent.

In 1663 he was elected Fellow of the Royal Society and regularly attended the Wednesday Suppers of the Fellows at the Crown Tavern behind 'Change. Taverns, indeed, if they housed *cognoscenti* for him to argue with, were Whistler's natural habitat. Both Pepys and Evelyn knew and liked him for a clubable companion. Evelyn called him "a very learned man" and "the most facetious man in nature." Pepys' diary refers many times to his erudition, and Samuel and he were forever discussing such important questions as whether ships' masts should be stored wet or dry, and the significance of the antiquities of Egypt, Lower's transfusion experiments on dogs, and a new and terrifyingly complex musical instrument displayed at a soirée at Gresham. Sometimes, however, the tone of the meeting was pitched a little lower, and we find the learned company "burning a hole in my Lord Brouncker's glove with a new sort of burning glass." On another occasion at a mutual friend's, Whistler's two "very pretty, very mirthfull" daughters made a good deal of sport with Pepys' assistance of a man named Creed's "gut and stomach." Later Pepys asked the minxes to sing, but he soon regretted his gallantry, for though they had both had singing lessons, their music was "the saddest stuff."

Evenings in taverns and in society, and the bills for clothes and jewels (and doubtless singing lessons too) incurred by the Misses Whistler must have kept the Doctor a little short of both time and money. When he suddenly succumbed on May 11, 1684 "of a malignant fever with peripneumony," the accounts and annals of the College were found to be in inextricable confusion. Whistler's friends, perhaps subscribing to the popular

belief that a corpse could be seized for debt, hustled him into a grave in the chancel of Christ Church, Newgate on May 12th. So great was their haste that the register of burials gives him the wrong christian name.

There can be no doubt that Whistler neglected the Records of the College and had a deplorable habit of confusing public money with his own. Both sins of omission are inexcusable in a man in his high office; but as his will left a large proportion of his estate to the College, they scarcely point to conscious and calculated embezzlement. Later writers, however, particularly Munk in the Roll of the College, have breathed the fire and slaughter of their righteous indignation on Whistler, and in their moral enthusiasm have sought to demolish his reputation as a physician as well. Cambridge commentators, the most recent of them Sir Walter Langdon-Brown, have been especially zealous in asserting (i) that the *De morbo puerili* is a simple plagiarism from Glisson's *De rachitide* published five years later and (ii) that it is clinically and academically worthless anyhow.

Year after year we hear the same dreary stories, told at unnecessary length, of how the College of Physicians set up a committee of seven to investigate rickets, and how they, with Glisson as their President, publicised their findings so generously that Whistler overheard them in Leyden. Nevertheless, the obstinate fact remains that Whistler had already finished his studies there and presented his thesis in the year the Committee began their labours. The *De morbo puerili Anglorum* was published in 1645, Glisson's *De rachitide* in 1650. Whatever one's views of their relative values, this much seems incontrovertible.

So much for the charge of plagiarism. What reply are we to make to the suggestion that Whistler's work is worthless? It is true, and indeed inevitable, that there should be a qualitative difference between the work of a young man recently qualified and that of an experienced physician at the head of a panel of experts from the College. But to dismiss Whistler's thesis as "vague" or marked by "entire absence of facts" is surely to be guilty of prejudice. Much of Whistler's knowledge must admittedly have come not from experience but from books, but his list of diagnostic signs shows evidence of real clinical skill and powers of observation. If the pathology of the thesis seems wildly speculative, we must remember that it was spun *e nihilo* in the writer's reason. When we find secondary infections and intercurrent dietary deficiency conditions lumped together with the true natural history of the disease, we must recollect that he had no systematic pathology, bacteriology, or biochemistry to call to his aid. Nevertheless, it is interesting to compare the clinical course of the disease and the gross

morbid anatomical changes associated with it, as described by Whistler, with those to be found in any modern textbook of medicine. Epiphyseal changes, defective ossification and dentition, fatty enlargement of the liver, fibrous changes in the spleen, craniotabes, the rachitic rosary, pigeon chest, spinal curvature, muscular weakness and abdominal distension are all included in Whistler's paper; and of the symptomatology, diarrhœa, pulmonary infections, mental changes, and difficulty in walking are all touched upon. The sections on treatment may strike us as absurd, but they are no better and no worse than the recommendations of any other seventeenth century physician. Rational therapeutics had, after all, to wait for the exact chemistry of the nineteenth century and in the case of the deficiency diseases, for the vitamin biochemistry of the twentieth.

So perhaps we are justified, after all, in claiming that, with all its shortcomings, Whistler's *De morbo puerili Anglorum* is a sound piece of clinical observation, considering the limited techniques at its writer's disposal; and that, at twenty-six years of age, young Daniel Whistler, "Eastern Anglo-Saxon," notched no small mark in the honourable history of English pædiatrics.

REFERENCES

Dictionary of National Biography, ed. Stephen and Lee. London, Oxford University Press, 1921, *21*, 9.

EVELYN, JOHN. *Diary*, ed. Bray. London, 1906.

FOSTER, JOSEPH. *Alumni Oxonienses* (*1500–1714*). Oxford, 1891.

LANGDON-BROWN, Sir WALTER. Chapters of Cambridge medical history. II. Francis Glisson and the insurgent century. *Proc. roy. Soc. Med.*, 1942–43, *36*, 17–24.

MUNK, WILLIAM. *Roll of the Royal College of Physicians* (*1518–1800*). London, 1861.

PEPYS, SAMUEL. *Diary*, ed. Smith. London, 1841.

STILL, Sir G. F. *History of pædiatrics to the end of the eighteenth century*. Oxford, 1931.

WOOD, ANTHONY À. *Athenae Oxonienses*. London, 1692, *2*, 547, 788.

Inaugural Medical Disputation
on the Children's Disease of the English
which the inhabitants idiomatically call The Rickets

which, God aiding him, Daniel Whistler, Eastern Anglo-Saxon, with the Authority of the Most Noble and Magnificent Rector, Dr. Johannes Polyander à Kerchoven, Doctor of Holy Theology and Principal Professor of the same Faculty in the illustrious academy of Leyden in Holland, propounds there for dispute for the Degree of Doctor and its entailed high privileges in Medicine, on the 18th day of October, at the accustomed hour and place.

At Leyden in Holland from the Press of Wilhem Christian Boxius, 1645.

To those most distinguished and gifted gentlemen, Drs. John and Radolph Whistler, my brothers, linked to me by the closest ties of blood and affection, and thus the more deserving of my attention, in gratitude and respect I give, assign, and dedicate this inaugural exercise.
Daniel Whistler, Author and Respondent.

Thesis I.

As scurvy amongst the inhabitants of the Baltic coast; plica among the Sarmatians and Poles; bronchocele or tumour of the throat amongst Alpine peoples; and venereal disease among the populace of India are all considered endemic, so the disease of which I treat is a peculiar and domestic scourge to our English infants.

II.

I admit that many symptoms, severally known to the ancients, make up the disease; but as a syndrome of those signs which together make up one pathognomonic whole, it was, to the best of my knowledge, unrecognized by them. It is said that it is some twenty-six years or thereabouts since it was first recognized in England, and its name, the rickets, is said to have been adopted from the surname of an empiric who first cured it. Others insist that the name arose as a country colloquialism from the neighbourhood around Dorchester, where those who have difficulty in inspiring (as frequently happens to sufferers from this disease) are in the idiom of the place said "to rucket." However, on the subject of the name I won't litigate further and let it be correct only in Britain to give a native word the right

of Latin citizenship—on this occasion let the infant disease of infants (with me as its godfather) bear the name of *Pædosplanchnosteocaces.*

III.

Diagnostic Signs

In listing the diagnostic signs I had rather say too much than too little.

1. In the first place, we may note an unnatural tenseness of the hypochondriac regions, or an abnormal swelling of the abdomen, with some hardness, especially on the right, below the region of the liver.

2. The epiphyses of the joints then swell up to a huge size for their age, sometimes out of all proportion to the growth of the rest of the body. This is particularly the case with those of the arms and feet—from which more notable symptom some dignify the complaint with the name *Pædarthrocaces* and *Pædarthroncias.*

3. Nodular swellings also grow from the sides of the chest at the costo-chondral junctions.

4. Furthermore, the whole bony structure is as flexible as softened wax, so that the flaccid and enervated legs can hardly support the superposed weight of the body; hence the tibiæ, giving way beneath the overpowering weight of the frame, bend inwards; and for the same reason the legs are drawn together at their tops; and the back, by reason of the bending of the spine, sticks out in a hump in the lumbar region, so that, since the patients in their weakness cannot (in the more severe stages of the disease) bear to sit upright, much less stand, some people call the complaint *Pædosteocaces.*

5. To these signs is sometimes added an increased size of head with hydrocephalus—from which sign, occurring with the second complex, one learned authority has, not unjustly, preferred to call the whole diathesis *Pædocephalarthroncia.*

6. In the softer parts—skin, flesh, ligaments and so on—a flaccidity and softness may be observed, appropriate to a younger child.

7. The teeth are cut later and with more trouble than they should be; and more often than not, decay when they have appeared.

8. These signs are generally accompanied by a narrow chest and a sharp and sometimes displaced sternum; sometimes the whole sternum, particularly the cartilaginous part, is depressed and inverted towards the bony margins of the ribs—which it early almost touches.

9. In the terminal stages, respiration is difficult—sometimes with a cough and phthisis.

10. A slow fever attends on this disease, irregular, of no fixed type, with erratic bouts of temperature.

11. The patient's pulse is irregular and weak.

12. The urine is frequently thicker than normal, often varying in colour and consistency, as it does in scurvy patients.

13. In diarrhœa and vomiting which sometimes supervene, sticky mucous excrement is passed.

14. Their appetite is normally poor; they take less than normal pleasure in sweet or sugary food.

15. They sleep moderately well—if not too much—unless they are otherwise prevented.

16. As for their behaviour, they are rather ingenious and precocious—which superstitious parents, if they are so minded, can take for a bad omen of their longevity; they do not enjoy playing and are serious beyond their years; but those who suffer from hydrocephalus as well are duller, because their brain is oppressed with much water or mucus; they are less than normally quick to anger; they love quiet and move slowly.

17. Pimples and spots are meantime spread over the face, chest and limbs, suggesting those of scurvy or venereal disease, according to whether it is suspected that the child's parents, grandparents or great-grandparents suffered from the one or the other of those conditions.

The rest of the symptoms which occasionally, but more rarely accom pany the disease, since they can arise from a particular bodily constitution or from the complication of other complaints, are not thought worthy of description.

Thus far I have demonstrated the attendants of the disease that stand, so to speak, in the Hall; but its more intimate satellites of the Bedchamber who, like private secretaries, are admitted into the bosom and heart, familiarity with dissection alone reveals. Now let us enroll those allies whom Queen Anatomy supplies to war down this new portent.

As many as, worn out by this disease, succumbed to a premature death and were subsequently dissected *post mortem* were found to have viscera affected in a most unnatural manner. First the liver was swollen beyond all nature and larger and whiter than in the healthy. The mesentery appeared more glandular than is right. Frequently also the thymus was swollen with scrofulous swellings—whence that type of scrofula which the English call "The King's Evil" often follows in a badly treated case of this disease. In others, the spleen and kidneys were also increased beyond their due size. Not rarely, the lungs were seen to be scirrhous and, worse, adherent to the

sides of the chest by fibrous bands. Furthermore, ulcers and abscesses are often found on them—whence it commonly happens that this disease turns into a phthisis. In nearly all cases the abdominal and thoracic cavities were found to be filled with dregs of yellowish liquid. The brain was very flaccid and in the late stages actually soggy, the affluent moisture overwhelming the sulci as well, and the dura firmly adherent to the cranium as if it were an inherent part of it. So that it is no wonder that when the above-mentioned symptoms afflict patients their strength is weak and their flesh thin; but surprisingly enough, the face is not emaciated with the rest of the body, but is fuller and more florid, like the faces of convalescents.

V.

The parts therefore that are principally affected are the viscera and the bony skeleton—for which reason I make so bold as to call the disease *Pædosplanchnosteocaces*. But whether they are equally affected *ab initio*, or whether first the bones and then the viscera—or first the viscera and then the bones—are affected, is still a matter for dispute. I was very taken with the words of that consummate scholar who postulated that this complaint was basically one of defective penetration by that nutritive fluid appropriate to the bones, which could be brought about for two reasons—1°: from the excessive density or imporosity of the bones themselves; hence it happens, he says, that the centres of shafts of the bones—which are less porous and more compact—are nourished and increased either not at all or at any rate proportionately less; on the other hand, the less dense, spongier and more porous parts, such as the ends of the bones and the epiphyses, are over-swollen. As if Nature, I suppose, invited by the capacity of the harbour, took to dumping all her food cargo in that market. 2°: from the excessive thickness of the nutritive fluid and its obstructive viscosity, by reason of which it cannot pass through the less porous parts of the bones, but must ebb back into the body and accumulate in the viscera. But the author of that ingenious theory must excuse me if, though but a back-bencher, I do not vote with him on this point. Clearly the middle of the shaft of the bone is harder, not simply denser, than the ends: the ends are fundamentally softer, not less dense and more porous. Weight and imporosity prove density: hardness is displayed by the firm union of the parts—whence they are able stoutly to resist division, so that they do not easily yield to compression; so women are looser and softer in skin and flesh; yet the male body is less dense and aperture-ridden—hence it sweats more easily and more liberally, and bears less well than the female the penetrating blasts of the north wind.

It is therefore the softer parts of the bone which the subtle fluid penetrates and distends, and not those of loose texture which the thick fluid finds to fill out and stuff. For I should think that the increased size of the joints was not due to the nutritive fluid but to a serous exudate. I am not content either —perhaps least of all content—with his supposition that the bones are first affected and then, after a perceptible interval, the viscera (indeed that the fluid overwhelming the bony pores, like basins, overflows and forms pools in the surrounding tissues). For in those who have been but lately affected by the disease the abdomen is distended, as if the viscera had already been harmed, though not discernible by any but the most experienced of physicians before the swelling of ankles and wrists occurs; when these parts swell up they denote an already maturing malady which any chit of a girl may recognize.

VI.

Of the continuing cause and the nature of the disease itself this is my proposition: I presuppose at present—and I shall try to defend my view in open argument against those who challenge it—that the blood leaves the heart by the arteries and returns by the veins: and that its egress from the ventricles of the heart is not a motion due to traction by the parts but to expulsion by the heart.[1] Let us then consider the disease from its earliest beginnings to be due to a pulse weak from its origin by reason of a cold distemper of the heart. This pulse is not thus sufficient to the task of irradiating the mass of the blood with vital spirits and, by the influence of its heat, of preserving the constituents of the blood in a perfect mixture and of preventing their splitting up. Now the viscous, fibrous and caseous parts of the blood, by reason of this weakness of the impulse from the heart, are not discharged so far into the framework of the body, but make their circuit in rather smaller orbits. However, on account of the slowness and thickness of the succulent fraction of the blood, the orifices, first of the arteries, then of the veins, in the lungs and viscera are not easily traversed—hence inevitably their channels must become blocked. Whence one may easily perceive why the lungs are usually heavier and the liver larger—by the accession of new and thicker material packed into them. Hence, too, arise tumours of various sorts—strumae, abscesses, and ulcers in viscera and glands, according to the manner in which the above-mentioned matter affects their various natures by its bitterness or decay. But the more serous and subtle fraction of the blood, now free of the caseous burden—for which, before its separation, it served as a vehicle—now breaks forth wherever it finds

[1] That is, a *vis a tergo*, not suction of the blood from the heart by the peripheral tissues. *Tr.*

access and courses through the capillary vascular channels to the framework of the body: and thus the weakness of the pulse is compensated for by the light and agile nature of the substance. But it is carried unequally to the various tissues according to the number and size of the paths to the different parts which lie open to it; or according as a part by its softness and tenuousness more easily admits the circulating serous blood, despite the initial weakness of cardiac function. Hence the epiphyses of the joints, particularly of the arms and feet, are greatly swollen by a copious afflux of this matter, both because they are softer and more easily penetrable and because —as you may see when the periosteum is scraped away—larger and more numerous veins and arteries are seen leading to the seats of the epiphyses and the bony tissues immediately around them than to the middle of the shafts of the bones. The brain, too, because it is softer and more open in texture than the other parts, more readily yields to the pulse of the arteries, even though they are but weak, and receives an injection of serous matter. But circulation through the cartilaginous parts on account of their softness is not the result, rather they are enlarged and distended because they are so pliant. Hence arise the nodular swellings in the chest at the costo-chondral junctions and ὄγκος or bossing of the wrist and ankle joints and hydrocephaloncia of the cranium, which in infants is more cartilaginous than bony. Meanwhile, all the truly bony parts are either not nourished at all or less nourished than they should be, for lack of the nutritive fluid which, with the thicker fraction of the blood, remains within the viscera and the lesser circulation. But they cannot be distended like the epiphyses on account of the brittleness of the bone but can only be bathed by the flow of liquid, for which reason the legs are emaciated, waxy, and flexible. For they ought rather to have become pliant so that they might be distended in every direction like a sponge, with no fear of breaking, rather than be bent little by little: for, in bending, the concave parts are compressed as much as the convex are dilated, whilst the middle parts of the bone stay as they are. But distended in proportion to an equal increase, all the parts become more reticular and separated from each other, one after another, remaining homogenous while their pores are stuffed with heterogenous matter. The rest of the body wastes as the viscera are obstructed, for lack of the nutritive fluid which is retained with the thicker blood. But the serous mixture which bathes the rest of the body cannot for lack of viscosity and richness agglutinate with the flesh but simply waterlogs it, whence results that præternatural emaciation and softness. The rest of the serum either remains in the abdominal cavities, thorax, and brain or is excreted in the sweat, is evacuated in urine and fæces, or passes out in insensible breath.

VII.

The continuing cause is therefore: in the viscera, a too thick, viscous, sticky, and obstructive nutritive fluid that is more humid and cold than it should be—in a word, the caseous fraction of the blood; in the bony and cartilaginous structure and in the larger cavities and the external organs, the fact that part of the blood is too serous.

VIII.

But the disease itself seems to consist in the collection of the thicker caseous obstructive blood in the viscera; similarly, in the lack of the nutritive fluid required in the bones and external tissues and the substitution for it of an afflux of serous fluid.

IX.

The internal antecedent cause which affects the continuing cause and which is, on my hypothesis, the prime mover, is the weakness of the pulse or the weak circulation of the blood, which does not adequately irradiate the mass of the blood by the influence of its heat to preserve its heterogenous parts in a perfect mixture without curdling or dissociating into their several fractions. For the blood when ejected by a weak pulse grows cold for two reasons: first, because it has become less hot as it comes fresh from the heart; secondly, because it returns more slowly. But because the cold blood is less perfectly mixed, it comes liquid from venesection; when the fibrous parts of the blood congeal, the lighter swim on top, as the spirituous heat, which is, as it were, the bond that holds the heterogenous fractions together, expires.

X.

As for what is relevant to the original causes of the condition, men seem to me vainly to assign to a new syndrome, and one appropriate to our people, causes that have long existed and are common to other nations. More cautiously, those who con the heavens and their predestined character in recent times wish to fix the set nature of this disease upon our infants because they live in our particular climate and are predisposed to it by the very nature of the English temperament. None the less, of the manifest disposing causes, which did and do dispose weak bodies to receive the full force of the malignity of heaven and determine that the influence of our horizon must inevitably lead to such a specific disease in such a specific individual, we must enquire further. In the last century venereal disease and scurvy have attacked our part of the world. We see them surviving in the

patients themselves and heritably com. inicated to their children in their seed. But if the power of the poison shall have been broken but not eradicated by antiscorbutics and antivenereals, is it surprising that the material which causes these conditions, recurring, displays itself in their descendants under another name and in milder symptoms? I have no hesitation in affirming that this is what happens in infants in whom there are eruptions of pimples and spots which make sufficiently clear their scorbutic or Gallo-venereal origin. In the parents these causes are whatever makes the ejaculation of semen weak or denies it a suitable delay in the ducts or dissipates the heat and virtue of the seed and makes the substance of the seed weak, in its latent qualities scorbutic or Gallo-venereal, its obvious qualities cold, wet and, in a word, raw. For the disease hardly ever attacks infants unless their parents have suffered from gonorrhœa, scurvy, scrofula, lumbago, or other long-standing and particularly cold and humid affections of brain or genitals: or unless the said parents have engaged in immature and immoderate frictions[2] or in over-hasty or enormous lovemakings or have indulged over-liberally in drinking. In wet nurses those can be the causes which make their milk thick, viscous, obstructive, and unfit for babies. Those who avoid a wet nurse with red hair are believed to be more prone to this disease, because red hair is a sign of warmth in the wet nurse, whose milk is therefore more cooked, dense, and caseous, since the heart lessens the serous fractions and makes them penetrating and unobstructive. Also the vile habit of engaging hired wet nurses, who feed an infant, still red from its mother's womb, with thick and fibrous milk is particularly liable to initiate or speed the progress of this condition; for the serous colostrum of the mother's milk is much more suitable for a tender infant, which needs both nourishment and a laxative at the same time—since the newborn baby is filled with a mucous excrement gathered in the internal parts of its mother and demands a medicinal type of milk, such as the mother provides in the first few months, to be both a food and a purge. But the immediate causes in infants are to be found in our thick and humid climate and our peculiar method of feeding and weaning them. Factors which make the fluid more solid and viscous also make it colder and damper than it should be. Nowhere in the world, to my knowledge, is meat given to infants so early and in such quantities as amongst us English. Nor has it been ill observed that infants will very rarely be afflicted by this disease if they take no other food than milk. It usually manifests itself between the first year and the beginning of the fourth. Indeed, experience has shown that

[2] Presumably masturbation.

the evil has attacked some children who were led to stuff themselves with meat before they had any teeth: then by an enforced abstinence and the administration of a few remedies, soon became strong again. The disease is most frequent in the ranks of the highest citizens, next amongst the dregs of the populace, least of all amongst those of moderate means. The cause in the first group I take to be intemperance of the parents and the fact that the infants are entrusted to the care of hired wet nurses; in the second, as well as mistakes in diet, lack of fires and a daily environment of dung and dirt and the use of cold and badly-aired napkins. For a native heat inherently weak is extinguished by external cold. From the foregoing description, I elicit my descriptive definition of the disease (*i.e., Pædosplanchnosteocaces*)—to be found in the parts primarily affected, the continuing causes and the chief symptoms.

XI.

Pædosplanchnosteocaces is a children's disease which attacks all the viscera and the bony skeleton on account of the unequal combination of the elements of the blood; whence the caseous fractions are packed together and stick in the viscera and obstruct them, while the serous fractions are expelled into the body or form pools in the body cavities. For this reason the abdomen swells, the ankle and wrist joints protrude, cartilaginous knobs form at the extremities of the ribs, the whole skeleton is wax-like and flexible, the head is enlarged, the soft tissues are flaccid, the sternum is depressed in the early stages and, as the condition proceeds, becomes pointed with consequent dyspnoea; and terminally there is a slow fever.

XII.

I will now explain the remaining causes of the principal symptoms. The swelling of the abdomen in the earliest stages of the disease arises from the increased size of liver and spleen. In the final stages the distension is aggravated by the presence of the watery and serous effusions in the abdominal cavity. I know indeed that in infants and the whelps of animals, the alimentary system is very large in the first months of life and the abdomen somewhat distended: nobody should rashly decide on this sign alone that the disease is present.

XIII.

The sharpening of the chest—or pigeon-chestedness—arises from many simultaneous causes. First, the lungs of the newborn are full of thick

blood. Whence many are suffocated in the first few days of life by lying on their backs or from compression of the thorax, because the lungs do not expand freely again. But now, thickened and made more dense by the disease, the lungs are able only with great difficulty to follow the expansion of the thorax downwards. Through the lateral fibrous adhesions by which in most cases of *Pædosplanchnosteocaces,* the lungs are bound to the chest wall. Since these fibrous adhesions more commonly run on either side from top of the lung downwards, the upper part of the chest is more rapidly made pointed than the lower, for the latter in the early stages is weighed down by the mass of the liver and hence flattened. If the lungs are not restricted by adhesions, yet since they are unduly heavy, they cannot be distended to a sufficient degree to fill the thorax to its full capacity: therefore the cartilages of the ribs turn inwards to fill the space that would otherwise become a vacuum and which the lungs cannot fill. This you will be more ready to admit if you consider that the ribs are soft and rather pliant—their softness and pliancy have already been exaggerated by the presence of the disease. You should also consider that infants affected by this disease are scarcely able to stand on their legs through weakness, but lie almost continuously in their cradles or on the bosom of the wet nurse or are wrapped in an unconsidered embrace. Furthermore, the increased weight of the liver helps the sharpening of the chest. For which reason it distends the hypochondrium, and the sides of the chest collapse inwards (and the spleen like another liver distends the left side in the same manner) so that the sides of the chest are flattened and the sternum is sharpened, particularly above the shoulder blades. For we said that the cartilaginous part is more often depressed in the early stages of the condition. Initially, when the liver is not yet grossly enlarged, it first plumps out the side nearest to it which is more yielding and is closely related to the greater part of its convexity. Then, when the liver's size is further increased by the firmer establishment of the disease, its mass lifts the sharp xiphisternal cartilage which its weight had previously depressed (since the diaphragm had been drawn down by the suspensory ligament of the liver and the xiphisternum dragged down by the presence of that same ligament in the middle).

Respiration is difficult for several reasons: because of the narrowness of the chest, of the great weight of the lungs, and of their fusion with the pleura through fibrous adhesions (which fusion produces in adults an intractable dyspnoea); because of the great mass of the liver which drags the diaphragm downwards and of the presence of yellowish fluid in the abdomen and thorax (which it hinders from a free respiratory excursion);

because (as is common in dropsical patients) of pulmonary phthisis where this is present. Finally (as happens with consumptives) it can be brought about by the feeble power of movement of those muscles devoted to the task of respiration.

XV.

The rest of the symptoms owe their origin severally or collectively either to extremes of heat or cold or to the thickness or unequal distribution of the blood or to the softness of the bones and the presence of a large quantity of serous matter.

XVI.

Prognostics

1. Those who are attacked by the disease from birth or before it invariably die. For it is a sign of the virulence of the cause of death that its invasion is so rapid. Nor in infants of such tender years is the power of nature sufficient to defeat the disease.

2. Most of those who labour under this affection are of the female sex, but females are more rapidly and certainly restored to health.

3. Hydrocephalics with gaping cranial sutures generally die.

4. Those who are better able to bear bodily disturbance more easily escape the disease.

5. Those who are already walking are easier to cure, as are still older children.

6. When the neck can scarcely support the head they seldom survive. Similarly when they have great difficulty in breathing. In cases of suppuration of the lungs and of phthisis, they never do.

XVII.

Treatment

The whole of the treatment is carried out in the light of these indications. Thick and sluggish humours which obstruct and weaken the circulation of the blood must be prepared for and drained off. The serous effusion must be tapped: the flow of blood or its entrant heat in the external parts must be increased. Finally the external symptoms must be dispelled by the use of appropriate medicines. Here are recommended specifics, antiscorbutics, occasional antigallo-venereals, hepatics, splenetics and arthritics. On account of their wonderful effects in combating this disease, root of King cup and crows' livers, dried in a baker's oven after the bread has been

taken out and then powdered, are reckoned specifics. Frogs' livers are also of proven value. Amongst frequently repeated nostrums, the remedy for curing this disease is blood-letting—not by venesection, but by the application of leeches either to the shaven head or in the interstices between the prominences of the ear when the cartilages have been divided. By which measure particularly our native female empirics happily undertake the complete care of the patient. It is clearly established on the authority of Hippocrates too (6. Epidem. S. 5. part. 22) who ordered scarification of the veins in the posterior part of the ear when κέδματα are present. But κέδματα on Galen's interpretation are effusions into the legs and hip joints. Furthermore, the Scythians, who were said to be familiar with κέδματα, were accustomed to bruise their veins to restore themselves to health. Of these, Hippocrates, in his Treatise of Air and Water, wrote that their joints were καὶ ὕγρα καὶ ἄνοτα (damp and feeble) and proved their constitution was immoderately moist. And so our native nursing women first draw blood from either ear, by cutting the ear three or four times between the two cartilages, but a little nearer the lower, with a small blunt knife. Stopping the ear to prevent the blood's running into the meatus, they ensure a satisfactory flow of blood by the use of prolonged rubbing and a warm bath at full moon. They withdraw the blood with a little brandy on a black woolen cloth which they daily bind on the knotty swellings of the chest. Secondly, they daily anoint the spine and all the joints with an ointment made of salt, ground honey and the leaves of the rosemary, dandelion and lavender of each M. ij.; of absynth and laurel of each M. j., of bruised black snails lib. j.—the whole cooked in May butter until it is rotten and then pressed out. Thirdly, they are careful to sprinkle all the patients' food —bread, milk and pottage—with penny-royal and Kingcup. Fourthly, twice a day they give their patients to drink a decoction of the above-mentioned root, of kingcup, of veronica, of yarrow or milfoil, of hart's tongue, of raisins, of liquorice and of aniseed. Some simply incise the ears and once a day treat all the joints with warm brandy on a sponge or wool taken after exposure for half an hour to the heat of the hearth, being turned round and round. The brevity customary in theses prevents my recounting too many empirical treatments which, if they are not attended by success, drive the sufferer in desperation to seek medical advice. But it must be realized here that many have recovered simply from the healing passage of time; others, whom I have indicated in the Prognostics, have proved unable to be cured by either nature or art. It has been observed that most of those who recovered by the aid of nature had first been stricken by diarrhœa and had

afterwards found better health. Most of those who seemed to have been treated without purgation have suffered incurable relapses or been suddenly seized by pneumonias or convulsions or eventually died of dropsy. And so let syrup of roses, syrup of chicory with rhubarb, Augustan syrup, rose syrup with mushroom, infusion of senna and rhubarb and powder of rhubarb be used as purges. Of course their weak little bodies should not from the outset be harassed by frequent purges, since a formed excrement will not result from them. But from the start with light washouts in the early stages, you may proceed to the appropriate well-tried preparations—amongst which the following is much commended:

℞ of Rosemary M. ss.
of Hepatica, scabiosa, agrimony, Venus' hair each M. j.
of Veronica (in English, *Speedwel*) M. iij.
of Kingcup ℥ij.
of Corinthian raisins[3] M j.
of Aniseed spoonful iiij.
Cook in spring water: lib. vj. ad lib. iij. To the filtrate, add, of sugar candy q:s to sweeten and, of yellow sandalwood[4] coarsely powdered and pressed into lumps ℥ij.

Let the patient drink a draught of this every morning, at four in the afternoon and in the evening. After seven days, unless purging follows of its own accord, add to the previous mixture, rhubarb ℥ij., syr. ros: with agaric q:i. and let the patient drink it for seven consecutive days and then return to the previous mixture.

In patients in the later stages, when the disease is well established, to free them of the serous effluvium you may decree a long but gentle cathartic over four, six, or eight consecutive days, afterwards repeating on the sixth or seventh day, with polypody,[5] flower of thyme, mechoaca[6] and Spanish saffron.[7] Then you may lay hold on one or other of the fontanelles,

[3] "Passulae majores Raisins. F. Raisins G. Rosinen" (Flückiger, F. A., and Hanbury, D. *Pharmacographia.* London, 1874.) What particular sort of raisins Corinthian raisins are I cannot say.

[4] "Ebn Serabi, called Serapion the Younger . . . was acquainted with the white, yellow and red sandalwood." *Liber Serapionis aggregatus in medicinis simplicibus,* 1473. (Flückiger and Hanbury, *op. cit.*)

[5] "*Polipodium*—Thys is called Pollipody, it is hote in the iiii degre and dry in the seconde degre. Thys Pollipodye is a ferne that grows upon okis or on walles or stones but the pollypody that groweth on okys is the best." *A boke of the propertyes of herbes the whiche is called an Herbal.* Anon. London, 1541.

[6] "Mechoacan is a great and almost insipid root, of an ash-colour without, whitish within, brought in slices from New Spain, where it grows in the island of Mechoacan." Moses Charras, *The Royal Pharmacopoea, Galencial and chymical.* London, 1678.

[7] John Parkinson's *Garden of pleasant flowers,* London, 1656, gives: "Carthamus sive cnicus sativus . . . we call it in English Bastard Saffron, Spanish Saffron, and Catalonia Saffron." The text has "car:hamo" which I take to be a misprint.

especially applying the cautery to the neck.[8] Thirdly, let the patient live in a warm atmosphere, dry either naturally, by reason of the time of year, or made so, by the use of candles and the burning of perfumed essences. And let him use the following internal agents to dry his tissues—china clay, sarsaparilla, white saunders wood, ivory (and sometimes Guaiac) and kingcup—boiled, infused and as powder on his bread, sauce, beer, and soup as the occasion offers. Let him also have external poultices on his belly, made of snails, salt &c. And a plaster of laurel berries. And let him have beds or couches of bran, fern-leaves, &c. and expose his belly only to the sun, or lie on hot sands, or bathe in the urine of a bilious boy, or use inhalations of warm boiled herbs. You may also apply bags filled with sand, salt alum, and sulphur to his belly—or oil of lily or dill or powdered aniseed, laurel berries or similar simples. Then you must stimulate his native heat and encourage the circulation in the external parts by one of the measures I have described, or by natural bathing, if it is possible. If it is not, by fomentations of brandy, Spanish wine or Muscatel, with an infusion of such herbs as are used in nervous diseases, mace, etc. In the case of poor patients after fomentations of strong beer, wine and lye, you must anoint with Martiate ointment and Exeter oil, to which add nut-oil pressed and flavoured with musk or spirit of salt, or the liquor of snails sprinkled with salt and dissolved by dropping. You must also speed the circuit of the blood by massage, exercises, tarring, vesicatories, blisters,[9] by taking your little patient by the heels and shaking him and by the use of bandages: take care of the weakness and laxness of the joints with a plaster compounded of sinews. Let the patients' epiphyses be smeared with an ointment to take the swelling down—such as Agrippa's ointment. For dispersing swellings of the epiphyses the following is appropriate:

℞ of fresh butter and fresh pork fat each lib. ss.
of goose-grease ℥iiij
of spermacetti ℥ij fol.
spoonfuls of green leaf of water-nasturtiums and brooklime Mj.
of leaf of sea-speedwell and ground pine[10] M ij.

[8] This remains very obscure.

[9] The text here has "phaenigmis" of which the *Complete chymical Dispensatory* of Schroder (tr. Rowland, London, 1669) writes: "*Phaenigmus*—it is gentler than a Synapism only making the skin red." "*Sinapismus*—a cataplasma to make red or burn the skin, more than phaenigmus or a vesicatory."

[10] "Of ground pyne or Jua Moscata—The Kindes:—There be three sortes of herbe called in Latine chamaepitys (as Dioscorides sayth) the one like the other in smell and fashion." Dodoens, *A niewe herball or historie of plants* (rt. Lyte, London, 1578).

of red sage and rosemary each M. ss.
of Alicante and Muscatel wines each lib. ss.
Let all the herbs be cut up and all cooked until the wine be consumed and the herbs decompose, and then let the decoction be filtered.
℞ of the ointment described above and of strong ale each ℥ ij.
Mix them together and let them be made hot and let them then be applied, heated over a candle flame, with plenty of vigorous massage, to the joints.

From the prescriptions I have given, certain ingredients may be omitted, according as the disease proves easier to cure. There is, however, one piece of counsel that might be given for the right initiation of treatment: it is most important thoroughly to explore the dispositions of the patients' parents, to see if they were infected with scurvy or the French pox or suffered from chills on the brain. And it will do no harm to include remedies for the scurvy with those you have employed, internally and externally; indeed it will sometimes be found to have been necessary.

Corollaria[11]

Whether it is more conducive to the health of infants to be suckled by their own mothers? Affirmavit.

Whether it is ever justifiable to bleed infants? Aff.

Whether the blood circulates? Aff.

Whether the blood is distributed by propulsion without any attractive force whatsoever? Aff.

Whether in Dysentery, vomiting and phlebotomy are ever suitable? Aff.

Whether in a patient with Apoplexy leeches are to be placed on the head and in no wise on the Hypochondriac? Aff.

Whether venesection from the patient's sides is of benefit in a pleurisy? Aff.

FINIS.

Acknowledgment

Thanks are due to John Pinsent, Esq. of Oriel College for help with some obscurities, to Dr. A. H. T. Robb-Smith for various assistances, and to Dr. A. M. Cooke for the loan of a photostat copy of Whistler's thesis.

[11] Extra questions put to the candidate by the Faculty.

Sir Thomas Browne's Embryological Theory

E. S. MERTON*

IT can hardly be a coincidence, one embryologist has remarked, that among the great men in the history of embryology so many possessed strongly philosophical minds. ". . . Of all the strange things in biology, the most striking of all is the transmutation inside the developing egg, when in three weeks the white and yolk give place to the animal with its tissues and organs, its batteries of enzymes and its delicately regulated endocrine system. This coming-to-be can hardly have failed, in the minds of those most intimately acquainted with it, to lead to thoughts of a metaphysical character."[1]

Browne's metaphysical speculations and his scientific observations on biological causation—on embryology and on the more comprehensive subject of generation—constitute the most ubiquitous subject in his writings. They are especially profuse in his encyclopedia of vulgar errors, the *Pseudodoxia epidemica* where, in the course of his refutations of superstitions (such, for example, as that the hare is both male and female or that young vipers force their way through the bowels of their dam), he brings all his scientific learning and experience to bear. But seldom, either in the *Pseudodoxia* or elsewhere, are his views clearly formulated. They must be quarried from mazes of casual comment and digression. With regard to his views on embryology, there is, however, one key passage. The third book of the *Pseudodoxia* deals with vulgar errors on animals, and in the last chapter of that book Browne comes to grips with this topic: "That the chicken is formed out of the yelk of the Egg."

Browne speculated about the nature of the seed, of embryogeny, of heredity, and of sex. He studied plant seeds, animal eggs, semen, and embryos. His theory was largely Aristotelian; as opposed to the then popular theory of preformation which held that the embryo existed preformed in the seed, Browne held to the older (as well as more recent) theory of epigenesis, which derived the embryo from a homogenous seed by a gradual process of differentiation and growth. However, with Browne's speculations we are not here concerned.[2] We shall rather watch Browne as he works out the evidence on a specific problem as a scientist and a scholar, checking his findings against each other in the laboratory and in the library. Meta-

* The City College, New York.

[1] Joseph Needham, *Chemical embryology*. Cambridge, Eng., University Press, 1931. (p. 7)

[2] See the author's *Science and imagination in Sir Thomas Browne*, New York, King's Crown Press, 1948, ch. 3.

physical thoughts on biological causation were for Sir Thomas Browne, as for William Harvey and Aristotle, grounded on physical evidence.

The origin, growth, and nutrition of the organism are centered in Browne's studies of animal generation in what he called "the doctrine of eggs." Hippocrates had introduced the basic method of embryology, examination of the chick's egg at successive stages of incubation. He was followed in antiquity by Aristotle and Galen, and in the seventeenth century, when the science of embryology is said to have started, by Fabricius ab Aquapendente, Harvey, and Malpighi. Up to the time of de Graaf (1672), the similarity between the eggs of ovipara and of vivipara was not understood. In spite of his famous doctrine *ex ovo omnia* and in spite of his own pioneering in the embryogeny of the mammal, William Harvey had failed to recognize that the ovary of mammals and the ovary of birds are homologous structures. De Graaf suggested that the vivipara proceed from eggs no less than the ovipara, a fact finally demonstrated by von Baer in 1827. Browne's "doctrine of eggs" comes from Harvey and Harvey's masters, Fabricius and Aristotle.

The origin of the chick in the egg was one of the great mysteries for the early embryologists. What part of the egg provided the formative material and what part the nutritive? This question was debated from the time of Hippocrates to that of Harvey. Four parts of the egg were considered: the yolk, the white, the chalazae (spiral bands in the white of the bird's egg, at either end, holding the yolk in place), and the cicatricle (a small disc of protoplasm in the yolk). Each of these possibilities Browne considers. In the opening sentence of his discussion, "That a chicken is formed out of the yolk of the Egg, was the opinion of Ancient Philosophers," he states the opinion of the oldest embryologist, Hippocrates, who considered the white the nutriment. Aristotle and Pliny held the opposite opinion, that the chick is formed from the white and nourished by the yolk. Aristotle, who, as Fabricius observed, leaves nothing unproved, seeks to demonstrate this from the different chemical properties of these two liquids: the yolk liquifies in heat and thus becomes a soluble nutriment during incubation, whereas the white hardens in heat. Fabricius and Harvey rejected both these opinions, holding that both the yolk and the white serve for nutriment. In this belief Browne follows them, adducing the following arguments: "Since umbilical vessels are carried unto it: Since much of the yelk remaineth after the Chicken is formed: Since in a Chicken newly hatched, the stomack is tincted yellow, and the belly full of yelk, which is drawn in at the navel or vessels towards the vent, as may be discerned in

chickens within a day or two before exclusion," it follows that the yolk serves for nutriment. As for the white: "Whether the Chicken be made out of the white, or that it be not also its aliment, is also very questionable: Since an umbilical vessel is derived unto it: Since after the formation and perfect shape of the Chicken, much of the white remaineth." The assumptions underlying Browne's arguments here, namely, that the chick cannot be formed out of material (i) part of which remains after hatching or (ii) which contains umbilical vessels, are explained fully by Fabricius. Fabricius distinguishes between generation on the one hand and nutrition and growth on the other: (i) Food must be supplied to the chick as long as it is enclosed in the shell; the yolk and white are stored in the egg up to the time the chick hatches: therefore, they serve as the chick's food. If they served as material for generation, they wou' l be used up much sooner than is the case, for generation is completely finished within a few days; (ii) The yolk and white would not need umbilical vessels for generation, because vessels are instruments of nutrition rather than of generation.[3]

With the yolk and white eliminated, the issue has narrowed down to a choice between the chalazae and the cicatricle as the origin of the chick. It is here that Fabricius and Harvey part company and that Browne is left stranded between them. Fabricius favors the chalazae. To establish his case, he uses the method of elimination. If the yolk and white are nutriment, then one can discover the formative material by a complete enumeration of the parts of the egg: "There remain in the egg the shell, two membranes, and the chalazae: no one would maintain that the membranes and shell of the egg are material to the chick; therefore the chalazae alone will be suitable material for it." He argues further that the chalazae are situated in that part of the egg, the blunt end, where the chick is engendered, and also that there are three nodes, or swellings, in the chalazae which seem to correspond to the three principal parts: brain, heart, and liver. Fabricius arrives at the conclusion that the chalazae and semen are "the especial instruments of the egg's action."[4]

Browne seems to have been taken in by these arguments, but the more acute Harvey was not. Thus after eliminating the yolk and the white as origins, Browne suggests the possibility of the chalazae or *"grando"* ("hailstones"): "Whether it be not made out of the *grando,* gallature, germ or

[3] Browne, Sir Thomas. *The works,* ed. Geoffrey Keynes. London, Faber and Gwyer, 1928–31. 6 vols. (II, 303–04) All references to Browne will be from this edition. Aristotle, *De generatione animalium,* V, 733b 1ff. Harvey, William. *The works,* tr. R. Willis. London, Sydenham Society, 1857. (p. 330) Fabricius ab Aquapendente, Hieronymus. *The embryological treatises,* tr. H. B. Adelmann. Ithaca, N. Y., Cornell University Press, 1942. (pp. 182–83)

[4] *Em. Tr.,* pp. 185–87, 207–08.

tred of the Egg, as Aquapendente informeth us, seemed to many of doubt: for at the blunter end it is not discovered after the chicken is formed; by this also the yelk and white are continued, whereby it may conveniently receive its nutriment from them both."[5] In spite of the cautious tone of the opening, Browne does proceed to infer that the chalazae can be the formative material—because after the chick is formed, the chalazae are no longer at the blunter or formative end, and because the chalazae are connected with the white and yolk, thus being able to receive nutriment from them. Elsewhere he also notes, as a matter of fact, that "the *chalazae* or gallantine . . . containeth 3 nodes, the head, heart, & liver."[6] Yet that Browne had read Harvey's *De generatione* is evidenced in the very chapter on the origin of the chick under discussion, and Harvey, from his close observations of the egg, had brilliantly disposed of Fabricius' arguments in favor of the chalazae. Thus of Fabricius' point that by complete enumeration of the parts of the egg, only the chalazae, after elimination, remained suitable for the formative material, Harvey remarked: "He is also mistaken when he speaks of the chalazae, as proper parts of the egg. The egg consists in fact but of white and yelk; the chalazae as well as the membranes, are mere appendages of the albumen and vitellus. The chalazae, in particular, are the extremeties of certain membranes, twisted and knotted; they are produced by the contortion of its component filaments, and exist for the purpose of more certainly securing the several elements of the egg in their respective places." Here Harvey described correctly the true function of the chalazae. On Fabricius' argument that the chalazae are situated in that part of the egg, the blunt end, where the chick is engendered, Harvey's attack is devastating: "Fabricius, therefore, reasons ill when he says [this] . . . for even on his own showing, this could never take place, he admitting that the chalazae are extant in either extremity of the egg, whilst the chick never makes its appearance save at the blunt end; in which, moreover, at the first commencement of generation, no chalazae can be seen." And further, he continues with painstaking exactitude: "If you examine the matter in a fresh egg, you will find the superior chalazae not immediately under the blunt end of its cavity, but declined somewhat to the side; not to that side, however, where the cavity is extending, but rather to the opposite side." Thus, contrary to Browne's inference that the chick was formed out of the chalazae because these were absent *after* the chick had been formed, Harvey pointed out that the chalazae were not there in the very beginning. Fabricius' argument on the three nodes in the chalazae corre-

[5] II, 303. [6] V, 434.

sponding to the three principal parts of the body Harvey flatly contradicts, citing only one example—that of the red mass of the nodes, supposed by Fabricius to be the rudiment of the liver, but which, says Harvey, "is neither situated in or near the chalazae, but in the middle of the clear colliquament; and it is not any rudiment of the liver but of the heart alone."[7]

This divergence between his two authorities is very interesting for the light it throws upon Browne's scientific imagination. The question of course is not why Browne did not follow Harvey in view of the confirmation by modern science of his position, but rather, why, in view of his own investigations of eggs, he allowed an opinion so crushingly and correctly demolished by Harvey to linger on as part of his mental furniture. His mind was stored with impedimenta from authorities, great and small, and the only answer seems to be that they simply persisted by force of inertia. Browne had absorbed so much and was so busy absorbing more that he never got around to putting his mental furniture in order. This is a chronic weakness of Browne's imagination. Neither his philosophical nor his artistic imagination created a coherent body of knowledge or a sustained work of art.

The above remarks are reinforced by a consideration of Browne's treatment of Harvey's positive contribution to the question of the formation of the chick. Though very different from those of Fabricius, on some points antithetical, Harvey's views too are retailed approvingly by Browne. Harvey finally gave the correct explanation, according to modern views, of the origin of the chick in the egg. He did so very simply, by abolishing the distinction between formative and nutritive materials, and thus once and for all laying the ghost of the controversy which had been going on ever since the sixth century B.C. about which part of the egg was for formation and which for nutrition—or almost laying it, because we have seen that some of the old arguments still lingered on, at least in the antechambers of Browne's mind. The *locus classicus* of the controversy was Aristotle's definition of an egg as "that from part of which the young comes into being, the rest being nutriment."[8] Harvey shows that Fabricius was misled by this concept. "In the egg," says Harvey, "there is no distinct part or prepared matter present, from which the foetus is formed . . . an egg is a body, the fluids of which serve both for the matter and the nourishment of the parts of the foetus."[9] Therefore instead of looking for a three-dimensional material, Harvey looked for a one-dimensional point, a growing

[7] Harvey, *Works*, 329–30.
[8] *De gen. an.*, V, 732a 29f.
[9] *Works*, 332–33.

point. This he found in the cicatricle: "In the egg, there is a macula or cicatricula, which endowed with plastic power, grows into the eye of the egg and the colliquament, from which and in which the primordial and rudimentary parts of the chick, the blood, to wit, and punctum saliens are engendered, nourished, and augmented. . . ." Harvey's simple solution to this old, troublesome question came from careful observation, through which he also correctly determined the uses of the chalazae: "They serve as poles to the microcosm of the egg, and are the association of all the membranes convoluted and twisted together, by which not only are the several fluids kept in their places, but also in their distinct relative positions."[10] It is no wonder that Browne expresses admiration of Harvey for such an illumination even though he could not allow it full play over the dark corners of his mind: "How in the *Cicatricula* or little pale circle formation first beginneth," Browne remarks, "how the *Grando* or tredle are but the poles and establishing particles of the tender membrans, firmly conserving the floating parts in their proper places, with many other observables, that ocular Philosopher, and singular discloser of truth, Dr. Harvey, hath discovered, in that excellent discourse *of Generation;* So strongly erected upon the two great pillars of truth, experience and solid reason."[11]

Browne's final position, then, seems to be a state of quandary, if not a dilemma. Both explanations seem to have influenced his concept of the egg. The one thing the cicatricle and the chalazae had in common was their small size in proportion to the rest of the egg. This feature Browne seized upon. In his investigations of seeds he had marvelled "in what diminutives the plastick principle lodgeth," and we may recollect his eager investigations of the neb or growing point in seeds. These investigations he recalls in his comment on the theories of the origin of the chick in the egg: "Now that from such slender materials, nature should effect this production it is no more than is observed in other animals; and even in grains and kernels, the greatest part is but the nutriment of that generative particle, so disproportional unto it." He confirms his traditional outlook by examples from the eggs of snakes and frogs, showing how "the lesser part of eggs must serve for formation, the greater part for nutriment."[12] Browne thus continues the old Aristotelian distinction, greatly though he admires the work of Harvey which obliterates that distinction.

[10] *Ibid.*, p. 455.
[11] II, 304.
[12] IV, 89; II, 303. For Browne's anatomical observations on eggs see III, 100, 14.

François Ranchin
Contributor of an Early Chapter in Geriatrics*

JOSEPH T. FREEMAN†

MONTPELLIER in the south of France is the chief city of the département of Hérault. Its history dates from the eighth century when Charles Martel destroyed Maguelonne in 737. Located in Bas-Languedoc, it is situated in a rich plain of the Midi bordering the River Lez, looks out on the Mediterranean Sea, and has as its very distant background the Pyrennees and Alps. In this setting a famous university was chartered in the twelfth century—a period which saw also the founding of its schools of medicine and of law. The location of the university was responsible for its historical preëminence. Free trade having been granted by Louis IX, the city was open to free-booters, soldiers of fortune, merchants from Egypt, Italy, and the Levant, the cataclysms of religious wars, and the waves of plagues carried there frequently by frightened refugees. Destined to suffer from its own hospitality, it had a core of integrity in its first families which managed to survive all disasters and to replenish its life from the wealth of their traditions.

Just as its population was decimated by epidemic disease, so was its spirit weakened by religious wars, and its buildings destroyed and rebuilt repeatedly, the spirit of men conquering hazards with great courage. In the bitter wars of the faiths, the Protestants captured the city in 1567 and held it against siege under the banner of the Duc de Rohan until 1622. Six years later the town walls were torn down. The famous Botanical Gardens founded in 1593 were despoiled and then neglected, and even the fourteenth century Gothic cathedral did not escape severe damage in the vicious internecine fight.

In the pathway of those going on and returning from crusades and pilgrimages, leprosy was at times so common that "no hospital existed for the admission of ordinary illnesses." On many occasions major epidemics of bubonic plague struck with severity: in 1361 during such a visitation 500 persons died daily, while in 1629 more than three-quarters of the total population succumbed. Other thousands were crushed in the civil war following the Reformation. Those dying from the fratricidal conflict of Catholicism

* Read at the Sixth Annual Meeting of the American Geriatrics Society, June 1949.

† Philadelphia, Pa.

François Ranchin, 1560 (?)—1641

and Protestantism probably filled as many graves in the ancient town as did the giant blows of disease. Both forces were almost equally uncontrolled.

The Ranchin family was one which shared in all these misfortunes of peace, war, health, and plague, and gave back to its natal city of its clan strength. City and family seemed equally indestructible and mutually dependent. Without citizens like the Ranchins, Montpellier might have become a picturesque ruin; without Montpellier, the Ranchins might never have been other than a fruitful family. It was a family devoted to the law, to city administration, and to the Catholic church. Jean, Étienne, and William Ranchin served these several authorities. The last, William, King's counsellor at nearby Toulouse, published a critical survey of the Council of Trent which eventually served to turn its author and a few other relatives to Protestantism. Essentially, however, the family was true to its religious traditions and benefited in material as well as in other ways from this basic loyalty.

François Ranchin was born in 1560,[1] the first of his line of this surname, and the first to study medicine, a difficult decision since he was descended and related to at least nine of magisterial rank in his own family. From his birth to his matriculation at the University of Montpellier School of Medicine in 1587 little has been recorded except that he lived without financial worry in a family of culture and esteem from which he derived a sense of responsibility to the most important elements in his life —his city, his university, and his Church. It is likely that these early years were fairly uneventful, conditioned by the constant public disturbances related to the emergence of the stringent force of Calvinism which reached Montpellier in his natal year. The Ranchins stood by Henry IV, and at birth François was endowed by the King with three church benefits from which he derived a life-long income judiciously utilized in accordance with the best tradition of such grants. This proper use, however, did not lessen the fact that the bestowal of these gratuities was a violation of human rights which played a major part in the upheaval against Catholicism. A man like François Ranchin could not have misused his privileges; in this he was an exception. However, he took pleasure in these honors and used the associated titles in his signed works with pride. A large measure of his future constructive efforts was based on the financial aid which he received in this manner, and despite his untonsured state and his marriage to Marguerite Carlenças (who bore him no children), he continued to have

[1] Broussonnet, "1560"; Panckoucke, "about 1560"; *Dictionnaire encyclopédique des sciences médicales* (Paris 1874), "about 1565"; *Dictionnaire historique de la médecine* (Paris 1837) "about 1565."

the income from the Priories of St. Martin de Florac, St. Étienne de Montant, and St. Peter de Vebron.

In 1592 he received his medical doctorate with marked distinction. His future was crystallized almost immediately upon his selection by André du Laurens to continue a course of lectures combining medicine and surgery. This course was unusual in that it was given in the French language, independently of the Latin course. Ranchin served faithfully and enthusiastically, being one of those individuals whose life is so indissolubly linked with a university that students and colleagues recognize the affinity instinctively, a type of school and family tradition reflected in many universities. Ranchin's work was accepted and appreciated, and in the natural course of events the King raised him in 1605 to professorial rank to fill the chair formerly held by Jean Saporta.

Such fortunate individuals as Ranchin are often the source of envy and petty jealousy, but he must have walked carefully since he managed not only to avoid these unpleasant reactions, but also to rise in the esteem of the group. In 1612 he was made Chancellor to fill the position vacated by the death of Professor Laurens in 1609. This position was achieved by election. The electors were the faculty and the students, and the appointment was confirmed by the Bishop.

From that day, says Broussonnet, Ranchin gave himself entirely to his school. Leisure, reputation, fortune were all consecrated to the medical family circle which had adopted him as their patron. This was more or less to be expected—an intelligent, industrious, and wealthy Ranchin naturally would gravitate to an important position. The affiliation was mutually rewarding.

Perhaps the union of a man with one school for life worked to the detriment of Ranchin's place in history. The University of Montpellier was endowed with the richest of traditions which Ranchin as an individual reflected. His life was adequate in this devotion, and his love was given fully to maintain the school through the most trying period of its history. That posterity failed to recognize his efforts can be understood; since the school was his main thought, he was content that its adornment should be his monument.

With every type of recognition that he could desire—scientific, professional, and administrative—Ranchin had established the bases of his life's work. He was fifty-two years of age and there was much to be done. As he surveyed the work ahead he was conscious of several deficiencies. For one thing, the famous anatomical amphitheatre (built in the time of Rondelet)

had been damaged during the religious wars and was in need of repair. Furthermore, the College de Mende, the so-called College of Twelve Doctors, had almost totally collapsed as a functioning unit and as an intellectual center. He restored it. He rebuilt the anatomy theatre and embellished it beyond its original glory. Using Roman stones and marble available from the ruins at Nismes (the amphitheatre of which had been fired almost a thousand years before by Charles Martel), he directed the reconstruction, decorating the walls with portraits of the distinguished faculty members of Montpellier. Memory, imagination, and hearsay provided some images of earlier teachers and these were added to the honor roll. This custom of portraiture persisted and an unbroken series of likenesses to 1239 can still be found on the walls, although the authenticity of some of the earlier portraits is questionable.

There are several stories about Ranchin which are of interest and give some insight into the mind of his age. To further his election to the Chancellorship he promised to donate a covering for the conclave High Table. He also had made a new scholastic robe like that worn by Rabelais. The back of this red robe, which is the typical bachelor's habiliment, was embroidered with the letters F.R.C. The coincidence of this sequence of letters gave rise to a story containing just a touch of tartness; Ranchin was supposed to have ordered this initialling with regard for the memory and distinction of FRANCISCUS RABELAESUS CHINONENSIS (François Rabelais) who had studied at Montpellier and whose portrait hung on its walls. As it happened, the same three letters stood for FRANCISCUS RANCHINUS CANCELLARIUS (François Ranchin, Chancellor). The pert inference was that Ranchin had suggested, by renewing thus the robe of Rabelais, that he was allying himself more than symbolically with that earlier and great personality. As to the covering of the conclave's table, it is of questionable significance unless it was a deed of possessiveness of greater importance to the seventeenth century mind than can be appreciated now. It might be fairer to ascribe it to an impulse of generosity as a feature of the general pattern of reconstruction and improvement to which Ranchin was dedicated. During this time he wrote and lectured, planned and completed new ventures, always paying the bills himself, which was no hardship considering his wealth and the nature of his income. For twelve years he worked happily during a period of peace in the land.

When he passed his sixtieth year Ranchin reviewed the results of some of his work. Most biographers have been critical of one step that he took at this time. While inscriptions to Jean Hucher and André du Laurens were

placed on the façade of the school, the following inscription was placed on the amphitheatre:

Q. F. F. S.

Theatrum hocce anatomicum alim à Majoribus constructum, injuriâ temporum collapsum, Franciscus Ranchinus, Cancellarius et Judex Universitatis, in gratiam patriae et posteritatis gloriam, ornamentumque Academiæ, perpetuamque memoriam, propriis sumptibus restauravit, et magnificè exornavit. ANNO M.DC. XX.

A similar inscription was placed in the College of Mende. Whether the idea came from Ranchin, from the staff, or from friends, should be of little concern. Certainly some pride could be permitted to this man for his life's work in the light of the knowledge of how all-important these halls were to him. No doubt a degree of immortality was assured to him by this small conceit. Others with less right and more ego have set up bigger monuments. The criticism of two centuries of commentators seems psychologically unjust.

Religious wars then recurred uglier than ever. In the fury of aroused feelings, citizen against friend, and sensibilities against judgment, the dearest possessions of the city were uprooted. Once again the school was marred and disfigured; the old families that stood firm in their faith were reviled. Ranchin was forced into exile. Mobs roamed the streets; graves were opened and desecrated. A school could not be maintained in such surroundings; the students were gone, and finally the teachers sought asylum. The University closed in June, 1621, and did not reopen until January, 1623, a nineteen-month interregnum which was so harmful to the school structures that those teachers were fortunate who could return to the College de Mende, restored ten years before by Ranchin's foresight. Finally the peace made by Louis XIII permitted Ranchin to return.

In 1629 Ranchin, Chancellor for seventeen years and Professor for twenty-four, was given another responsibility. He was made Mayor of Montpellier, a position in keeping with his family tradition. This was the beginning of one of the most trying periods of his life during which he became involved in many situations which led eventually to his death.

Again plague had come to the city as it had done so many times before. It struck perniciously—just a few suspicious cases, then a lull when physicians felt a sense of security, following which, in full force, the pestilence broke. During the next eight months it claimed five thousand inhabitants of the city. Ranchin maintained control as best he could and from his ob-

servations wrote a text on the disease, although he was not quoted in Astruc's work on the fevers a century later.

Exhausted by wars and disease, and the common end-results of both, the depleted citizens and their leader apparently were granted a respite. Intellectual interests again were permitted to blossom, and Ranchin completed his major book, the *Opuscula medica.* This was the third of his five major publications, printed in Lyons in 1627. It is a critical compendium of a great number of medical ideas. The chapter on gerocomica is one of the earliest in the literature, the subject having been mentioned by a few outstanding authors, *i.e.,* Arnaldo de Villanova, Marsilio Ficino, and Francis Bacon. As such, belatedly, it belongs in the history of geriatrics.

He continued for another eleven years of peace, crowned with the veneration of his fellow-citizens, the respect of his associates, and the affection that his qualities aroused. For the time, passions and furies were limited to intellectual discussion. This part of his life, from his professorship to his death, surpassed all the rest. In the last phase of his life the plague struck again, brought to the city once more by wandering soldiers. Again the ageing professor and mayor had to answer the challenge of his old and ever-renewed enemy. This time, not equal to the physical task, he contracted the disease and in May, 1641 succumbed to it.

In all of these notes there is a singular absence of the warm qualities of personality from the story of François Ranchin. Whether he was lost in the major upheavals of his age or so merged with his school as to be indistinguishable is difficult to tell on the basis of such few facts. Despite his secular career and marriage, he was a beneficiary of the Catholic Church in a rôle usually reserved for the priesthood. He probably was humbly sincere in his ambition to make his place only in the locale of the University of Montpellier Medical School. He can be visualized as gracious and dignified, affable and ingratiating, judging from the results of his works in the absence of other concrete proof of these qualities. There are some suggestions that he was pompous; his life's story does not confirm this impression.

His works are sound even though it is likely that the Gerocomica chapter might be only a modernization of the earlier writings of Arnaldo de Villanova from the same school. If he sought recognition through his name in the marble halls, it was no less than the signature of an artist on his handiwork. To have carried out the duties of Mayor as well as his professional responsibilities up to the time of his death indicate qualities that warrant his return at least to the lesser gallery of the hall of medicinal fame.

The known works of Ranchin follow no particular trend, revealing

his interest in many aspects of medicine as well as reflecting the intensity of each phase of his career. His first work resulted from his appointment by du Laurens as lecturer and a year after its publication was followed by his appointment to professorship. His last work (published posthumously) contained his observations on bubonic plague. In 1627 he published his medical essays, *Opuscula medica utili iocundáque varietate referta,* in which there are chapters on illnesses in children, young girls, older persons, pathology, and other fields of medicine. The chapter on Gerocomica is very vivid as is shown by the following excerpts:

In the foreword he says:

Not only physicians, but everybody else attending old people, being accustomed to their constant complaints, and knowing their ill-tempered and difficult manners, realize how noble and important, how serious and *difficult,* how *useful* and even *indispensable* is that part of practical Medicine, called Gerocomica, which deals with the conservation of old people and the healing of their diseases.

Then he explains each item:

Its *indispensability* results from the deficiencies of nature because of the hardships, the pains, the weaknesses, with which old people are afflicted almost without interruption. They are exposed to so many troubles of so many types that they seem to be in constant need of medical aid.

Its *usefulness* is demonstrated by consideration of the political fact that the administration of economical and political matters depends on the conservation of old people.

Its *difficulty* is shown not only by the peevishness of old people, but especially by the fact that this science has been neglected by our forefathers and even by modern authors, too. What has been written about the conservation of old people and the healing of the diseases of old age, is so bad and so unproductive that we get the impression not only that this noblest part of Medicine was not cultivated but even that, yes, it has been flatly suppressed and buried.

Now then, with God's help, let us start spiritedly with this important, serious, difficult, useful, and indispensable work. We like to teach how this science will aid in the conservation of old people, how it will throw light upon the genesis of the diseases of old age, and how—with what methods—it could be expanded by considering the diseases of the parents.

The following excerpts are given by way of definition:

. . . it will be the task of the Gerocomica to deal with old age, with the nature of ageing, its definitions, and its limitations.

. . . we like to classify our subject into two chapters: (a) the conservation of old people, (b) the healing of the diseases of old age.

Gerocomica is that part of medical art which considers the state of health of old people, and the healing of the diseases of old age.

. . . As analeptical remedies are suitable to those who are recovering from disease, prophylactic remedies for healthy people, and appropriate nutrition for young men, Gerocomica attends to the life of old people.

. . . old age is the closing period of human life, a period which follows manhood and extends to its decay.

. . . it might be better to define old age as the last part of life in which a cold and dry temperament are dominant.

. . . old age is rather the way to utter decay than the actual destruction which means death.

He follows the galenic tradition as would be expected:

. . . Galenus in his book "On the Protection of Health" (V, last chapter) knows of three different types of old age. The first is the vigorous and robust old age—as he calls it—as long as the old people are capable of doing their business and professional work. The second is the mature old age, which alone should be designated as "old age." The third is the decrepit, deadly, and fatal old age, where only the funeral obsequies are missing.

The beginning of old age depends on the ending of manhood, because the ages follow one by one. As the ages differ not only through the varying intervals of years, but also through the variety of the types of bodies, therefore there are some who grow old more quickly, some more slowly.

Nevertheless, commonly people begin to grow old with the fiftieth year.

And he cites scriptural authority, despite a slight contradiction:

. . . Before the deluge our forefathers grew old more slowly, because they enjoyed the blessing of a longer life. About the thousandth year was the limit of their life. Immediately after the deluge human life was shortened, and the hundred and twentieth year was as good as fixed as the limit of life by God, according to chapter 6 of Genesis.

Many geographers and most historians demonstrate that people do not reach the same age in different parts of the world, and they maintain that there are people even in this century who continue life until the hundredth, two hundredth, and three hundredth year. However, we who think that the authority of the Holy Scriptures deserves more confidence than the records of the historians, recognize the limit fixed by the Royal Psalmist, all the more since common experience justifies him. Yet we believe that people today reach old age less frequently than at the time of David.

The Plan of the Chapter

The first section is divided into a general discussion of diet and other environmental influences, a description of particular foods, and the type of diet necessary in certain diseases. These general sections are described as "dietetic and conserving," "therapeutic and healing."

With regard to the former, Ranchin is strongly in favor of the value of diet in the conservation of health and is scornful of those who are so inconsiderate as to feel that it is "pious and humane to invite old people to die," criticizing those who hold that "old people should be . . . . encouraged to die than to undergo the signs of old age arriving as the result of proper diet usage." Nevertheless, he insists "that in old age, diet is not only useful but necessary as well, both for the conservation of health and for longevity."

He drew an early distinction between normal old age and that complicated by pathological changes: "Old age impaired by infirmities and misery is not identical with . . . vigorous . . . old age. There are endless remedies." The "conservation and duration of life depend partly on nature, and partly on the medical art," the former through proper nourishment, the latter through chosen remedies.

As regards the medical profession, somewhat prophetically considering his own death, he felt that the reason that physicians do not live longer than other persons is that they "make nothing of themselves and are moved rather by profit than by the protection of their health. Day and night they expose themselves to the contagions and infections of sick people."

The reflection on rural versus urban environment has been made frequently: "Rich people . . . destroy the principles of life in their youth by licentiousness . . . therefore, they grow old quicker than peasants and rustics whose life is usually longer and healthier through their sobriety and purity."

Having dealt with diet in general, the theme is then expanded to indicate other types of body-satisfaction such as alcohol, exercise, rest and sleep, with a recurrence of that intriguing medical question: "Is it salubrious or tonic for old men to sleep with young persons?"

In the description of the particular foods for older persons there is a detailed approach to all the main essentials of good diet in a manner similar to a modern text in dietetics followed by a section on the particular types of diet necessary in certain conditions such as cough, kidney stone, pulmonary diseases, *et cetera.*

In the second main section of the book, having disposed of many generalities, Ranchin discusses prophylaxis and therapy both in general and particular. In the first section there is a suitable materia medica very reminiscent of Bacon and of Arnaldo de Villanova, including rather famous prescriptions such as the Aqua Marci Galli for the prolongation of life, the Elixir of Thaddeus Florentinus for the retardation of hoariness, Aqua Fioravanti for the retardation of the ageing-process, and electuaries of Villanova, Peter Aponensis, and Ficino. Here, too, are the elements of balneotherapy, massage, and oil inunction. Finally, the procedures for bowel care, phlebotomy, and other methods of blood-letting are discussed.

In the second part of this section he deals with special therapy, Therapeusis, "called by Galen, 'the nurse of old men.' " In this part he takes up the question of mental disorders asking, "Are they called the diseases of old age because they pertain to the age or because they depend on the age in

addition to the cause of a sickness?" This is as modern as Nascher. Symptoms, signs, theories of ageing and healing are touched on.

Finally he discusses the special diseases of older age (divided into four parts), the first having to do with the head and special senses, the second with pulmonary and cardiac disorders, the third with the abdominal organs, and the last with joint and neurological disorders.

The Works of François Ranchin

Questions françaises sur la chirurgie de Gui de Chauliac. Paris, 1604. Also: Rouen, 1628; Amsterdam, 1661–62 (Dutch translation).

Oeuvres pharmaceutiques. Lyon, 1624. Also: Lyon, 1628.

Opuscula medica, utili, iocundáque rerum varietate referta. Lyon, 1627.

Opuscules ou traictes divers et curieux en médecine. Lyon, 1640.

De morbus ante partum, in partu, et post partum. De purificatione rerum infectarum post pestilentiam. Lyon, 1654. (Published posthumously.)

Bibliographical Sources

Astruc, J. *Mémoires pour servir à l'histoire de la Faculté de Médecine de Montpellier.* Paris, 1767. 432 pp. (pp. 257–58, Book 4)

Broussonnet, J. L. V. *François Ranchin, professeur et chancelier de l' Université de Médecine de Montpellier.* Montpellier, 1844. 25 pp.

Dictionnaire des sciences médicales. Biographie médicale. C. L. F. Panckoucke, Ed. Paris, 1824. (Vol. 6, pp. 535–40)

Dictionnaire encyclopédique des sciences médicales. Paris, 1874. (pp. 293–94)

Dictionnaire historique de la médecine, ancienne et moderne. Paris, 1837. (Vol. 3, pt. 2, pp. 776–77)

Eloy, N. F. J. *Dictionnaire historique de la médecine.* Mons, 1778. (Vol. 4, pp. 28–30)

Gurlt, E. *Biographisches Lexikon.* Berlin, 1932.

Mackenzie, James. *The history of health and the art of preserving it.* 3rd ed. Edinburgh, 1760.

The Story of a Quarantine*

B. K. RACHFORD†

WE sailed from New York with eighty passengers, sixty bound for Nassau, and twenty for Cuban ports. The bright skies and smooth waters that gladdened our parting promised that our journey was to be a most delightful one. Sailing under the most favorable auspices, we were a happy company, and almost every face shone with the joy which comes from putting aside care and anticipating pleasures amid new and delightful scenes.

Among our number were a few invalids who had been sent in search of health to the warm and equable winter climate of Nassau, but for the most part we were pleasure seekers, including a number of men of large affairs, who with their families sought a period or rest from the worries and cares incident to the management of large business and professional interests.

On shipboard the barriers which would have separated the individuals at home were broken down and very soon isolation from the rest of the world and, for the time being, common interests brought us near together and united us into a social band for the voyage.

While I enjoyed the companionship of many of my fellow passengers, I was from the beginning especially interested in the half dozen children aboard. I very soon grew to know them well and to have more than a passing interest in their welfare. I have always thought that they were unusually attractive and joyous. They ranged from six to twelve years of age, and all of them had had the advantages which wealth and culture could give, and now appeared especially happy and free in the enjoyment of this new experience of life on an ocean steamer.

There was, however, one family that from the first attracted my attention. The father, William Jackson of New York, had recently made a large fortune on the stock exchange. The successful deal, which had sent him away from home a millionaire, had been preceded by a number of years of intense financial excitement and nervous strain, and was followed by a nervous prostration which caused him to seek rest and quiet in an ocean trip.

* Being a paper written for presentation at a local literary society about a half-century ago and describing experiences that took place in 1889.

† Late of Cincinnati, Ohio

Mrs. Jackson, the heroine of my story, was a good example of the tender, motherly, self-reliant, and capable American woman: simple and gentle in her home relations, confident and resolute amidst the cares and increased responsibilities that had come to her since the nervous breakdown of her husband.

Little Mary Jackson, about whom center the tragic incidents of this story, had by the death of an elder sister two years before, become the only surviving child of Mr. and Mrs. Jackson. Since the loss of her sister she had been her parents' idol and during this time she had grown so deeply into their hearts that all on board our steamer noted the unusual devotion and mutual dependence which existed among the members of this family. The child was six years of age, she had an unusually pretty face and sweet manners which endeared her to all who came in contact with her and helped us to understand the idolatry which she excited in her parents.

We had been out about twenty-four hours when Captain Jones of our steamer came to me, the only physician on board, and asked if I would see the Jackson child, as she had been sick all night. I was directed to two large staterooms on the lower deck occupied by the family.

As I approached the room Mrs. Jackson met me in a state of great excitement, and said, "Doctor, my child has been very sick all night; she has a very sore throat, and I fear that she has diphtheria." Before entering the room I learned that there was at this time a widespread and severe epidemic of diphtheria in the portion of New York City in which the Jacksons lived. There had, in fact, been a number of cases and several deaths from this dread disease among the children on the same block; this had caused them to hurry away from home a few weeks earlier than they had expected. I examined the child's throat and saw at a glance that she was suffering from malignant diphtheria. The disease had spread so rapidly that the membrane covered the tonsils and pharynx, and was spreading rapidly into the nose. The mother, who stood waiting the verdict, was quite overcome when I told her that her worst fears were realized, that her little girl had diphtheria, and in a most severe form. For a few minutes she stood dazed and helpless before me, then threw herself crying upon the bed that held her sick child. Mr. Jackson stepped out of the room and sat down nervous and helpless, crying like a child. Ten minutes later Mrs. Jackson arose to her feet as calm, as collected, and as self-possessed as any trained nurse could possibly have been, and with the greatest deliberation announced that while she felt her child would surely die, she was prepared to make a bitter fight for her life. She told me that they were willing to make any sacrifice and to

spend any amount of money in the attempt to save little Mary. She was their only child and was loved by them above everything else in the world.

I left the stricken family and went in search of our captain, to find what medicines there were on board that might be of use in such an emergency. In the small medicine case which the captain produced, I found nothing which could be of service to me, except a bottle of the tincture of chloride of iron. With this medicine I made a throat wash which I applied to the child's throat as thoroughly as it was possible. The same drug was also administered internally. This with large quantities of whiskey and milk constituted the only treatment that could be given. After doing all that I could for the child, I returned to the captain to talk over the situation with him, and to determine what was best to be done in the circumstances. Captain Jones told me that he feared that if we went into the port of Nassau with a case of diphtheria on board, it would seriously inconvenience all of the other passengers, and that we would undoubtedly be subjected to a long quarantine before we would be allowed to land. After discussing every possible phase of the situation I decided, for many reasons and especially for the protection of the other children on board, that it would be best to quarantine the family in their rooms. At my suggestion, therefore, the captain ordered the quarantine, and gave directions that no one except myself should enter or leave the Jacksons' rooms, and that all communication between them and their fellow-passengers must be made through me, and from this time until we cast anchor near Nassau, the letter and spirit of this quarantine were absolute. This order having been given, I advised the captain to have all the other children aboard moved to the upper deck so that they might have the freedom of that deck without the possibility of coming in contact with the contagion. Captain Jones, who throughout the whole of this unhappy affair proved himself to be a firm, bighearted, and generous man, at once fell in with my suggestion, gave up his own room to a number of children, and soon had made such arrangements that all the children on board were safely quartered on the upper deck.

With this quarantine system established, I devoted myself to the Jackson child. I saw her every hour during the day, and almost every hour during the night. I became very much attached to her, and she also grew fond of me, and always spoke of me as the "ship doctor." She would ask for the "ship doctor," and when I came into the room she would drink her whiskey and milk to please me, after having refused to do so for her mother. My influence over her was so great that I felt it my duty to look after her nourishment as well as her medicine. I acted therefore in the capacity of nurse

as well as doctor. This beautiful little girl grew worse as the days went on, and her mother found more and more difficulty in getting her to do as she wished. During one of my visits she told her that if she would submit to the painting of her throat, she might have her blue dress on tomorrow. This little blue dress, it seems, had been the child's delight and the mother had been in the habit during the past few days of coaxing her to do things with a promise that she might "wear her blue dress tomorrow." As the night wore on, and as it proved difficult at times to get her to submit to such throat applications as were necessary, I found myself also saying, "if you will do this, Mary, you may have your blue dress on tomorrow," and as we worked earnestly and faithfully with the little means at our command, fighting almost without hope against the malignant, advancing disease, the little blue dress was constantly invoked, and always successfully, to help us in the efforts we were making to save her life. During the last three days of the voyage the unequal fight was continued, and on through the last night we spent on board the steamer until early morning when we cast anchor just off Hogg Island, a few miles from Nassau.

In the meantime the Jacksons had been told by me that the Captain expected trouble when we attempted to land at Nassau and that it would be necessary for us to report the diphtheria case and await the action of the health officers before we could land. I also told them that Captain Jones feared that the entire company aboard might be held in quarantine, and that if by good luck we should be allowed to land he felt sure that they would be sent to the quarantine station.

All during the third day the Jacksons were in a state of great excitement over the prospect of being sent to quarantine, and they constantly plied me with questions as to where the quarantine station was, as to what medical advantages it offered, and as to how long they would have to remain there. I was unable to learn anything definite from the Captain or anyone else on board concerning the quarantine station, except that it was a small island some five miles out from Nassau lying to the north and east of Hogg Island. This was all that could be learned, and the Jacksons were therefore in a state of most intense nervous expectation and awaited their fate much as condemned criminals await the halter.

When, on the morning of the fourth day, our steamer cast anchor off Hogg Island, in sight of Nassau, there was the greatest excitement on board. Men, women, and children hastened from the breakfast table to the deck, in the hope that they were soon to leave the unhappy ship that had been the scene of so much anxiety and dread. Everyone on board now seemed happy,

there was a hurrying to staterooms, a gathering of bags and bundles, a rushing to the decks, and all seemed overjoyed with the prospect that we would soon be on land again. The excitement was increased, and the ship rang with the merry clamor of the children, as a large tug appeared in sight on its way to us from Nassau. This was the tug which was to take us and our luggage safely into port. It drew up and its commander, a long-haired, sun-burned, and gruff old sea-captain, came on deck. When he was told by Captain Jones that we had a case of diphtheria on board, he at once announced that he would not be able to act in the matter until he had returned to Nassau and called a meeting of the Health Board.

This Board consisted of three members, two of whom were physicians, and the third was this old sea-captain himself. Captain Jones, who had been so kind and thoughtful through the whole of our trying voyage, introduced me to the tug's captain, and asked him to take me with him to Nassau, that I might explain to the Health Board how strict had been our quarantine and why, therefore, it was safe for our passengers to land. This, he said, he could not do, but he consented to take a letter from me to the Nassau Health Board detailing all of the facts.

In the Purser's room I carefully related in a letter to the Health Board all of the facts pertaining to the sickness and strict quarantine of the Jackson child, and gave it as my professional opinion that our entire company, exclusive of the Jackson family, could be landed in the city without danger of spreading contagion. This paper was delivered to the sea-captain, and the tug pulled away for Nassau leaving our disappointed company to pass the dreary day as best they could. Hours went by, and no news came from the town. Eyes were strained, and field glasses were brought into requisition, but nothing could be seen of the little tug which had disappeared behind Hogg Island on its way to the city. The day was one of great nervous strain, and every passenger on board felt tired and worn as the afternoon passed without any word.

I spent much of this day with the Jacksons. The father's grief and the mother's heroism were terrible to see. They had lost all hope of escaping quarantine, and were now planning to make its hardships as light as possible. With this object in view, Mr. Jackson had authorized me to say, in my letter to the Health Board, that he was willing to go to any expense if they could only be quarantined on the Island of New Providence itself, a short distance outside of the city of Nassau. He even proposed to purchase any house that might be selected by the Health Board and to pay all of the expenses necessary to the most rigid quarantine, and when his child recovered

or died, as the case might be, to burn the building and all that it contained, and to deed the lot to the city, and to place himself and family under the direction of the Health Board for a length of time necessary to the protection of the inhabitants.

Mr. Jackson also discussed many other propositions with me, and gave me full authority to make any arrangement that money could make with the Health Board, provided only that his child should have comfortable quarters and be within easy reach of proper food and medical attention. As the incidents of this story will show, the Health Board of Nassau felt it to be their duty to refuse all of these generous propositions.

Late in the afternoon I was called on deck by an unusual commotion among the passengers, which I soon found was occasioned by the announcement that the tug had been sighted rounding Hogg Island on its way a second time to our steamer. While there was much pleasure manifested at the sight of the tug, yet the feeling of uncertainty as to what the decision of the Health Board might have been caused many to suppress their feelings and await with intense anxiety and eager expectation the coming of the tug. We on board the steamer, anxiously waiting almost the entire day for news, could not understand what had occasioned the delay, and why we had been kept in this state of suspense for so long a time, when the question of our landing seemed to us to demand a speedy answer. We afterwards learned that Nassau had never seen but three cases of diphtheria, and all of these had been fatal. Two of these patients were the children of one of the physicians, who at this time held a place on the Health Board. His prejudice, therefore, against the dread disease was natural, though extreme, and no doubt caused the long delay through which we had suffered from early morning until late in the afternoon.

Slowly the tug drew alongside our steamer. The old sea-captain again appeared upon our deck, and immediately announced, "All may go ashore except the Jackson family. The Jackson family to quarantine." This he called in a deep, gruff voice, so loud that it could be heard in almost every part of the vessel. Immediately there was confusion, caused by the hurrying to and fro, the pushing of trunks, the moving of baggage, the happy shouting of the children, and the general excitement which naturally followed the relief from the strain which had all day held the entire company.

Amidst this confusion I followed the tug's captain and asked him to come with me to the Jacksons' rooms, in order that he might give them some information concerning the quarantine station to which they were to be sent. They wished to know how they were to go and what conveniences

they would find when they reached there. For some time the old captain refused to go with me, saying he did not have the time, but that I might tell the Jacksons that they were to remain in their rooms until the other passengers had left the steamer, and then a row-boat would be provided to take them to the quarantine station. Knowing that this information would not satisfy them, I persisted in my efforts to have him grant them a personal interview, and at last with evident irritation he followed me to their rooms. As we approached the door Mrs. Jackson came out to meet us. There she stood as cool and self-possessed as ever. Her face white and with a voice slightly trembling, she asked the strong and burly man who stood before her what provisions had been made for her child. The captain in a matter-of-fact manner told her that the quarantine station to which they were to be sent was a little coral reef about five miles out at sea. It was uninhabited and had not been used as a quarantine station since the yellow fever epidemic of three years before. There was only one house on the island, and this was a small frame building, containing little furniture except two iron bedsteads. He therefore advised them to take from their staterooms all of the bedding necessary to their comfort. He further told them that there was no physician on the island, and as yet the Health Board of Nassau had had no opportunity to make any arrangements for the comfort of the patient. All of these things he said would be attended to by the Health Board as soon as possible the next day, and a physician would then be sent to visit the child. He further told them that all their food would have to be sent from Nassau, and if any cooking were done they would have to do it themselves upon an oil stove which they could procure if they wished in the town. He did not think it would be possible for them to secure either nurses or domestics to assist them. Mrs. Jackson exercised the greatest self-control while with repeated questioning she elicited the above information, and then her whole demeanor changed, her face lit up with anger and indignation, and she uttered the most heartrending appeal that it has ever been my misfortune to hear. She led the old captain to the door of the stateroom and pointed to little Mary pale and listless on her bed, and spoke as follows: "That little girl is the only child I have and she is to me more than all of the world. We are willing to sacrifice everything we have in the effort to save her life. Willing to buy anything that money can buy, pay any sum the city of Nassau will designate, provided only that we be given a fair opportunity to fight for her life. But instead of giving to us this opportunity, instead of accepting the proposition we made to you this morning, you have decided to send my child to this isolated spot, far away from

proper food, medical attention, and all those things which offer a chance of recovery. You have banished her to this little island, there to let her die, without even giving us a chance to save her life. Can it be possible that Nassau is under English Government, and that English people will pass this sentence upon me and my child? I beg of you, if you have a heart, or if you have children at home, to do all in your power to help me save my child."

This and much more did Mrs. Jackson pour into the ear of the old captain, who gradually melted under her influence to the extent that he told her, that while he could not change the decree of the Health Board, and while it would be necessary for her to go to the quarantine station, as had been directed, yet he promised to go with me as soon as we reached the city and find a physician who could be sent to them that night, and who would remain with them as long as they needed him. He further promised that he would use his influence with the Health Board to allow me to make daily visits to the child and consult with the resident physician. After this interview the sea-captain hurried on deck to look after the moving of baggage and other things preparatory to the departure of his tug.

In a short time, even before our tug had left the steamer, we saw the Jackson family with all their belongings, and with all their stateroom furniture, move off in a small sail-boat, which gradually disappeared in the distance as we were carried in the opposite direction on our way to the city. When we reached Nassau I followed the old sea-captain ashore and clung closely to him for an hour until he finally found the young physician, whom he had promised Mrs. Jackson should be sent to them that evening.

Dr. Barrett was a young man, a citizen of the United States, who had sought this climate a few years before in search of health. Health he had found but no practice. He was therefore quite willing to accept the position which was offered him, and he went at once to the Jacksons, taking with him such medicines as we thought might be needed in the treatment of the child.

The next morning, by permission of the Health Board, I made my first visit to the quarantine station. It was a delightful sail through quiet, clear waters over the beautiful sea gardens, past coral islands, until we came in sight of a small reef a quarter of a mile long and about one hundred yards wide at the widest point. On this little island was a flag pole from which floated a yellow flag, the quarantine signal, warning all passersby to avoid the island.

When I reached the little reef I found it almost entirely devoid of vege-

tation. In its center was one large cactus plant, some ten feet in height and spreading its broad, thick leaves several yards in every direction. On the leaves of this plant I found half a dozen names written out in full with a date beneath. I afterwards learned that they were the names of yellow fever patients who had been quarantined on the island years before. On scratching the leaves of the plant with a sharp, hard instrument, a soft white substance would exude, which would harden there and remain for an indefinite period. In this way these unfortunate yellow fever sufferers had left the record of their deaths on a living monument.

Proceeding to the little house, which was the only one on the Island, I found my little patient lying on one of the iron bedsteads, which had been made comfortable by the bedding taken from the steamer. There was no other furniture in this room except an improvised stool and bench which Mr. Jackson had "knocked" together. In the only other room in the house was another bedstead and a small coal-oil stove which had been sent out from Nassau the evening before in the boat that carried the doctor. Two or three iron knives, the same number of forks and spoons, with a few cups and saucers, were all they had for the table. The house itself was a rude lattice-work structure, through which the wind had whistled the previous night, making a weird and mournful sound which helped to keep the child restless, nervous, and unhappy. Shortly after her arrival Mary had been frightened by seeing a large lizard run along the lattice work, and she had appealed to her mother to take her back to the steamer, as she was afraid to stay there any longer. Her mother quieted her as best she could, and told her that the "ship doctor" was coming to see her the next day, and that if she would be a good girl and let him treat her throat she might have "her blue dress on tomorrow." Mrs. Jackson had tactfully taught the child to look forward with pleasure to my visits. My coming, therefore, was always a pleasure to her, and one of the few events in the day to which she looked forward.

After greeting my little patient and giving to her some flowers that had been sent by her fellow-passengers of the steamer, I made the medical examination and instituted such treatment as I thought best. I told Mrs. Jackson at this time, as I had previously, that the disease was steadily progressing and that I had little or no hope of her child's recovery.

I made my visits about the same hour each day, carrying with me a large basket of flowers sent to little Mary by her fellow-passengers, now luxuriously quartered at the "Royal Victoria." The flowers contributed much to her happiness and made her look forward with even greater pleas-

ure to my visits. On the second visit I found my little patient worse. At this time I learned that no one had set foot on the island since I left the day before, with the exception of a boatman who brought the provisions. He made one visit to the island each day, and acting under the directions of the Nassau Board of Health, he placed the supplies on shore some distance from the house, and then getting into his boat and pulling out into the water a short distance he called to Mr. Jackson to come and get the provisions he had brought to them. All communication between Mr. Jackson and boatman was carried on by calling to one another over the water. In this way food and other supplies were ordered to be delivered the next day. On leaving the house after this visit Mrs. Jackson followed me to the door and said that she wished to have a talk with me. She told me that she realized that Mary was getting weaker from day to day, and that she had quite given up all hope of her recovery; she wished therefore to discuss with me the question of the removal of the body of her dear little girl, as she had fully decided that when death came she would take it home for burial. She said that this matter had been constantly in her mind for several days, and that she felt it would be a relief to her to talk with someone who might assist her in meeting the emergency when it came. She asked me, therefore, to make such inquiries as I thought best, and to make any arrangements which the circumstances demanded. While she proposed to fight to the last for her child's life, yet it would be a relief to her to know that when the worst came, she would then be in a position to take her home. I promised her to look into the matter on my return to Nassau, and left her standing in the door, a picture of quiet courage, self-control, and determination, and Mr. Jackson, who had taken little part in the conversation, seated on the porch with head bowed in his hands.

The third morning I received a note from Dr. Barrett, who had continued in constant attendance upon little Mary since the night she went to quarantine, saying that our patient was much worse, and that croupy symptoms had developed during the night. He asked me to come prepared to stay all day and if possible all night. He further requested that I bring with me from the hotel two sheets, that she might have a change of bed linen.

The Health Board would not grant me permission to spend the day and the night with the child; I therefore could do no more than make my daily visit. When I reached the island I found her in a desperate condition. The mother still continued to fight for her child's life. Day and night she sat at the bedside, urging Mary to take her medicines and nourishment,

and frequently made the promise to her that if she would do as she was directed, she might "have her blue dress tomorrow."

On leaving the Jacksons this day I told them that I had made some inquiries which led me to believe that if they wished to take their child's body home, it would be necessary for them to charter one of the sponging schooners now in the harbor, and sail across the Gulf Stream to the Florida coast. One of these vessels I had heard was now lying at anchor without cargo and could probably be engaged for this purpose. If they wished me to do so, I would see that owner and make conditional arrangements with him to hold himself in readiness if his vessel should be needed. Dr. Barrett, who heard this conversation, said that it would be impossible for the Jacksons to do this. He had lived in these waters a number of years and spoke from an accurate knowledge not only of the sponging schooners, but also of the course it would have to take in going to Florida. These schooners, he said, had no accommodations for passenger service, and he believed it would be absolutely impossible for Mrs. Jackson in her present condition to take such a journey in such a boat. He told them of the dangers of the Gulf Stream, and of the privations which they must necessarily undergo on such a voyage. For these and many other reasons he thought it unwise and inexpedient for Mrs. Jackson to attempt this trip. When the doctor had finished speaking Mrs. Jackson calmly turned to me and asked me to proceed with the arrangements, as she had fully decided that she would take her child home, or perish in the attempt.

On my return to the town I communicated with Mr. Johnston, a gentleman who had previously interested himself in many things pertaining to the welfare of the Jacksons, and asked him to secure a schooner for the purpose of transporting them to Florida, and to have it in readiness for use at any time.

The vessel was secured, a two-masted schooner having two small sleeping apartments beneath the deck. These were the rooms occupied as lodging places by the crew when they were sponge fishing. The vessel was large enough, and Mr. Johnston, who knew the waters well, decided that it would answer the purpose, and arranged with its owner to get it in readiness for the trip, and promised him if his vessel were not used by the Jacksons, that he would be paid for the time it was held under orders.

The next morning I started as usual for the quarantine station, and as I approached it I saw the yellow flag that had been floating from the flagstaff fall to half-mast. I knew by this signal that little Mary was dead. I continued on my way to the island, and with reluctant step approached

the house that had been the scene of the sad tragedy. As I neared the door Mrs. Jackson appeared in its opening. She stood there like a statue, pale, erect and apparently composed, and as I stepped on the porch she said, in a quiet, trembling voice: "Doctor, it is all over, and I have kept my oft-made promise to my darling child. She now has 'her little blue dress on.'" We entered the room and there found little Mary, cold and beautiful in death, clad in the little blue dress which had been her delight in health, and which had served so often during her sickness to coax her into doing that which was thought best for her recovery.

As the mother stood over the corpse of her child, she placed the flowers as usual by its side and told me of the struggle that she had had during the night. We then left the room to join Mr. Jackson and to talk over the arrangements that would be necessary for leaving the ill-fated island, Mrs. Jackson insisting that they were determined they would never leave until they could do so with the dead body of their child. They could not bear the thought of leaving her amidst the cruel scenes that had been in part responsible for her death.

Two days later the old sponge schooner set sail from the quarantine station. It carried besides its crew Mr. and Mrs. Jackson and the body of little Mary, which by direction of the Health Board had been placed in a metallic casket, adult size, this being the only size obtainable at Nassau. This casket was hermetically sealed in a large zinc box which had been made for the purpose. By order of the Health Board the schooner sailed north from the quarantine station, so as to round all of the small islands in that portion of the sea, leaving them between the city of Nassau and the schooner as it turned westward on its way to Florida.

The vessel landed after some days at a small town on the Florida coast where the Jacksons were cordially received by the Mayor and the people of the town who, after hearing their sad story, had the casket removed from the schooner to the railroad station, whence it was at once shipped to New York.

On Jewish Medical Students of Padua

JACOB SHATZKY*

AN article by Bruno Kisch (*Journal of the History of Medicine*, 1949, *4*, 450–459) regarding "Cervo Conigliano, A Jewish Graduate of Padua in 1743," calls attention to the fact that although a wealth of scattered material pertaining to the history of Jewish medical students of Padua has been published, a comprehensive study on that subject is still a desideratum.

The author mentions only one branch of the Conigliano family. There was, however, another branch, on the maternal side of that same family, which also gave renowned servants to the medical profession. Joseph Stern (Stella), for instance, who died in 1720 and who obtained in 1707 the degrees of Doctor of Philosophy and of Medicine at the University of Padua, was a nephew of the brothers Salomo and Israel Conigliano.[1]

Source material pertaining to Jewish medical students of Padua tells us a story of heroic efforts of ambitious young Ghetto Jews to enter the University in spite of the many domestic and legal obstacles with which they were confronted, even though as early as 1409 Padua had bestowed its medical doctorate on a Jew. Jewish students met with great difficulties in obtaining the degree of doctor. Yet they flocked from several countries, different cultural backgrounds, poorly prepared to meet the prerequisites of admission and lacking sufficient knowledge of Latin, the current language of instruction. The majority of these students were foreigners, coming from countries where Jews were not admitted to the universities, and from a deeply ingrained Jewish religious atmosphere highly unfavorable to the pursuit of secular education. To a sociologist of medical culture it is very gratifying to study the historical development of this trend of learning, to follow the incessant pilgrimage of Talmudic students from Poland, Germany, Hungary, and other countries to Padua where the foremost medical school had opened its hospitable doors to non-Catholics, and to analyse their subsequent readjustment in various countries of Europe in general, and in their place of birth in particular. Such a study would be the first sociological interpretation of Jewish acculturation in terms of the medical vocation.

Those who aspired to medical schooling met with disapproval, not

* New York City.

[1] Wachstein, B. *Die Inschriften des alten Judenfriedhofes in Wien*. Vienna, 1917, *2*, 106–107.

only on the part of the Rabbinical authorities, but also on the part of some of the Jewish physicians of those days.

Joseph Samuel del Medigo (1591–1655) of Crete, for instance, himself a student of Padua (at the age of fifteen), reproached the Jewish parents who sent their children to the University of Padua to study before they were well grounded in Judaism.[2]

If the objection to the study of medicine was so strong, how then did a Polish Jew succeed in making such a daring and costly trip to Padua, in paying tuition which for Jews was almost double the usual amount, and then in staying several years in a foreign and partly unfriendly country to conclude his studies? As far as Poland is concerned, the answer is unique and very instructive indeed. A considerable number of those students were supported by members of Polish aristocratic families who took a paternal attitude towards some of "their" Jews who were desirous of studying medicine. The "chosen" ones, after concluding their training and returning home, served as family physicians to their patrons for a limited period of time stipulated in advance by written agreements still extant.

Among these patrons was the Chancellor of Poland (in the sixteenth century), Jan Zamoyski, who was himself a graduate of Padua. In the city of Zamość, founded by him, there was a physician by the name of Tobias. Zamoyski was impressed by his dexterity in medical practice and decided to send him to Padua for a "post-graduate" course in surgery under Girolamo Fabrizio d'Acquapendente (1537–1619), who had, at that time, a host of pupils from Poland. However, Tobias, in a letter addressed to his benefactor, expresses his doubts as to the profitability of undertaking such a trip, since his knowledge of Latin was not sufficient to take such a course.[3]

But not all of those who went to Padua studied medicine at the University proper. Some Hebrew sources indicate that private tutoring was common, not only with graduate Jewish physicians, but also with non-Jews. The language of the instruction was Hebrew and Yiddish, or Judaeo-German, as it was labelled in those days. There are several autobiographical prefaces to Hebrew and Yiddish medical books telling a fascinating story of such preparatory instructionship for medical training. (For instance, the two Yiddish books by Moses, the son of Benjamin Wolf from Kalisch (Poland), printed in 1677 and 1679, and the Hebrew book: *Me-*

[2] Mann, J. *Texts and studies in Jewish history and literature.* Philadelphia, 1935, 2, p. 679.

[3] Lempicki, S. *The educational activities of Jan Zamoyski.* Cracow, 1920, p. 244. (In Polish) See also: Fritz J. Polish physicians who studied under H. Fabricius ab Aquapendente. Repr. fr. *Atti del' VIII Congresso Internazionale di Storia della Medicina,* Pisa, 1931.

galeh Sod (The Revealer of the Secret) by Doctor Aaron Emmerich, Hamburg, 1765.)

Jewish students in Padua were accepted, as a rule, as members of the student bodies, or corporations, as they were called, usually organized after national patterns. The entire student body was divided into 31 "nations," later dropped to 24, and by the end of the eighteenth century there were only 22. The largest was the German corporation, since it accepted students from various countries neighboring on Germany. Thus, for instance, in the sixteenth century the "German Nation" had, for a very short time, 5,083 members. Later, Polish Jews were accepted as members of the Polish student body. The statement by the Jewish historian Dubnow, repeatedly quoted by other historians, that the Jewish students formed a student body of their own, is not warranted.[4] It has been mentioned previously that the Jewish student was not considered equal to the non-Jewish. Not only was he compelled to pay higher tuition, but he was also burdened with special taxes and had to be host to numerous members of the student body he joined, at his initiation.

A glimpse into the customs prevailing among the students of Padua is revealed in a letter of 1797 written by a German student to his parents. "Here at the University," he writes, "there are 22 various nations, Jews and Turks among them. A Jew desirous of becoming a doctor has to pay to the University 20 pounds of sweetmeats, of which ten pounds the German nation takes for itself, to be distributed among its members. Since we are a group of 10 students only, thus every one receives one pound. This is an old custom, and so, to a Jew, the privilege of becoming a doctor is more costly than for a German, who has to pay less than one fourth of that amount. This is only because he is (not) a Jew."[5]

That the Coniglianos, the Italian-Jewish family of physicians, are not the only family of professional doctors, is well attested in the annals of the history of medicine. Poland also had such a family, the Gordons of Wilno, with a record of three of its members Padua graduates. One of them, Aaron Gordon, studied at Padua in the years 1692–1695. He was in advanced age when he went to Padua to study medicine. After returning home, he was appointed Court Physician of the King August of Poland. He died in Wilno in 1717.[6] The Gordons were holders of private scholarships awarded by the members of Polish nobility.

The same applies to Hungary, where Jewish youth, anxious to study

[4] Dubnow, S. *Weltgeschichte des juedischen Volkes.* Berlin, 1925, *6*, 143.

[5] Haumann, G. *Bruchstücke zur Biographie.* Prag, 1803, *1*, 95.

[6] Kon, P. One of the earliest Jewish physicians in Wilno. *Yivo-Bleter* (Yiddish), 1930, *1*, 53–61.

medicine, found generous support among the Hungarian feudal aristocrats. In spite of good source material extant, no study has been written, as yet, about the Jews of Hungary as students of Padua.[7]

One of the most interesting episodes in the history of Jewish medical instruction in Padua was the conflict regarding the demands to produce Jewish corpses for anatomical dissection, which the University required. Moses Vital Cantarini, a scion of an eminent Italian-Jewish family of scholars, wrote a Hebrew treatise about this problem, which was, however, never published.[8]

In conclusion, I would like to call to the attention of the medical historian the following printed sources relating to the Jewish medical students of Padua.

The most important sources have been published systematically by *Stanislau Windakiewicz* of the University of Cracow. The introductions are written in Polish, but the documents published in the original Latin and Italian. These are the minute-books, protocols, and other documents of the "Polish Nation" in Padua, covering the period between 1592 and 1743. They are printed in the *Archiwum do Dziejów literatury i oświaty w Polsce* (Archives of the History of Literature and Education in Poland), Vols. VI and VII, 1890–1892. The same author published a synthetic study in "Przeglad Polski" (*Polish Review*), 1887, and also a book on Padua (Cracow, 1891, 164 pp.). In addition to it, the Jubilee Volume, issued in Italian by the Polish Academy of Learning, under the title: *Omaggio dell' Academia Polacca all' Universita di Padova* (Cracovia, 1922, 364 pp.), contains valuable contributions on the same subject written by competent Polish historians, such as Lachs, Windakiewicz, Kot, and others.

As to the man, "Pictor," mentioned in Kisch's article, who received a medical diploma in 1695, it should be stated that the name is a latinization of his German-Jewish name, which was Koppel (Jacob) Maler or Mehler (Painter—pictor).[9]

About Jewish medical students of Padua outside of Poland, the articles of Morpurgo,[10] Soave,[11] Post,[12] Schiess,[13] and Holler[14] are of interest.

[7] Veress. *A páduai egyetem magyarországi tanuloinak anyakónyve és iratai* (1264–1864). (Matriculations and documents of the Hungarian students of the Padua University.) Budapest, 1915.

[8] *Hebräische Bibliographie*, 1874, *16*, 37.

[9] Friedenwald, H. The diploma of a Jewish graduate of medicine in Padua (1695). *Ann. med. Hist.*, 1929, *n.s.i.*, 634–637.

[10] Morpurgo. Notizie sulle famiglie Ebree esistite a Padova del XVI secolo. *Corr. Israel*, 1908–09, Nos. 6–9.

[11] Soave, M. Medici hebrei laureati nell' Università di Padova. *Vessillo Israelitico*, 1877, *24*, 189.

[12] Post, Gaines. Masters' salaries and student fees in the mediaeval universities. *Speculum*, 1932, *7*, 181 ff.

[13] Schiess, T. *Briefe aus der Fremde von einem Zürche Student der Medizin* (1550–1558). Zurich, 1906, 38 pp.

[14] Holler. *Des Memminger Arztes B. Ehrhart italienische Reise im Jahre 1661*. Memmingen, 1898.

Notes and Queries

Edited by RALPH H. MAJOR, M.D.*

Brassavola's "Examination of Medicinal Simples"

ANTONIO MUSA BRASSAVOLA of Ferrara (1500–1555) is one of the earliest Italian writers on *materia medica* of importance. According to Ferchl[1] he owned one of the largest and earliest recorded collections of drugs and was responsible for introducing a number of new drugs into the pharmacopœia. His *Examination of Medicinal Simples* was written in the form of a dialogue, and some doubts seem to have arisen as to the existence of the first edition of Rome, 1536. Thus Garrison and Morton[2] mention that it has been reported but that they were unable to trace a copy; Arber[3] states that "an edition of 1536 is referred to, but it has not been seen by the writer, and the Union Catalog (Washington) does not list any copy in an American library."

The object of the present note is to describe a copy which recently fell into the writer's hands. The title is *Examen omnium simplicium medicamentorum, quorum in officinis usus est* (see reproduction); it measures 21.5 x 28.5 cm. The collation is: (12), 120, (1,1) *ll.* The book is very attractively printed by Anton Bladus de Asula (Rome) and this is the only edition to be printed by him: the many reprints were all much smaller in format.

In addition to its pharmaceutical interest the book contains much to intrigue the student of the history of chemistry, e.g. the following chapters: De Metallis, De Terrarum Genera, De Oleis, De Salibus.

New York, New York DENIS I. DUVEEN

Items of Medico-historical Interest from Scotland

From 26 November 1949 to 31 January 1950 visitors to the Corporation of Glasgow Art Gallery and Museum were privileged to see a special exhibition, "Medicine in History," organized as part of the celebrations to commemorate the 350th anniversary of the Royal Faculty of Physicians and Surgeons. The exhibition included portraits, charms, early books on medicine, late eighteenth and early nineteenth century medical caricatures, pharmacy jars, mortars, pill slabs, bleeding bowls, and surgical instruments. Special exhibits illustrated

* Department of Internal Medicine, The University of Kansas School of Medicine.

[1] *Chemisch-Pharmazeutisches Bio- und Bibliographikon.* Mittenwald, 1937, p. 67.

[2] *A medical bibliography.* London, 1943, No. 1748.

[3] *Herbals, their origin and evolution.* Cambridge, 1938, p. 275.

Antonimuſe Bra

ſauoli Ferrarienſis, Examen omnium ſimplicium Medicamentorum, Quorum in officinis vſus eſt, Ad Illuſtriſſ. & Sereniſſ. Principes Herculem Eſtenſem Ferrarie Ducem et Renatam Gallam.

M D X X X VI.

Title-page of Brassavola's 'Examination of Medicinal Simples'

the history of dentistry and radiology. The history of the Glasgow Royal Infirmary and the Royal Faculty of Physicians and Surgeons of Glasgow was represented by a collection of minute books, registers, and other documents as well as instruments and pictures. A reconstruction of an operating theatre as it might have appeared in a Glasgow infirmary in the 1890's, when surgery was under the influence of Sir William Macewen, gained authenticity from the use of one of Macewen's operating tables, a dressing steriliser evolved and used by him, and other similar apparatus. Displays of particular interest were devoted to Lister, Macewen, William and John Hunter, William Cullen, and Joseph Black. The Lister exhibit, arranged to demonstrate the novel techniques which Lord Lister introduced, was built around specimens of his original catgut, his jaconette for dressing wounds, his lac plaster carbolic dressing, his carbolic spray, etc.

A printed "Guide to the Exhibition," which numbered upwards of 750 items, provided an historical introduction and notes.

The collection at the University of St. Andrews of books, manuscripts, holograph letters, portraits, and engravings dealing with alchemy and historical chemistry has been augmented recently by a gift of more than 80 books, many of them rare works, given by Dr. Leonard Dobbin, the doyen of Scottish chemists. (Cf. *Nature,* 25 Feb. 1950, p. 309.)

LLOYD G. STEVENSON

Dentistry in Scotland

The Scotsman for May 16, 1950 gives an excellent account of a lecture delivered in Edinburgh the previous day by Dr. J. Menzies Campbell of Glasgow —probably the first lecture, according to the speaker, ever to be given in a Scottish university on the rise and progress of dental surgery in Great Britain.

In early times, the dentist was merely a tooth-drawer and very often a charlatan. Sometimes the blacksmith who made the instruments would construct a set for his own use. For a time "pelicans" and "keys" displaced the forceps, the tooth being levered or twisted out by these ingenious though barbarous tools. The first step in the progress of dentistry was taken by Charles Allen who wrote a textbook entitled *The Operator for the Teeth,* printed at York in 1685. In Allen's day, dentures were fashioned out of solid bone or ivory, after careful measurement of the mouth with compasses. Chemant, in 1789, was the first to introduce a denture made entirely of porcelain; vulcanized rubber did not come into use as a base until the following century.

Dental education had its beginnings in a small way at John Hunter's house in London, when William Rae, son of James Rae, an Edinburgh surgeon, delivered a course of lectures on dentistry in 1782.

Dr. John Smith was a pioneer of comprehensive dental education in Edinburgh, when he instituted lectures on dental surgery at the Royal College of

Surgeons in 1856, although before that time dental anatomy had been taught by Goodsir and Rae. The Edinburgh Dental Dispensary which later became the Dental Hospital and School, was founded in 1860 by Smith, Nasmith, Imlach, and others.

At the close of his lecture, Dr. Menzies Campbell demonstrated a number of dental instruments for his own collection.

A Note on the "Doctors' Mob"

In the Winter, 1950, issue of the *Journal of the History of Medicine*, Dr. Jules Calvin Ladenheim has presented an excellent account of "'The Doctors' Mob' of 1788," with a clear demonstration of the importance to medical science of the relations between the public and the profession. One statement of his, however, warrants further examination. In discussing the legal and political aspects of the riot, Dr. Ladenheim says: "Furthermore, inasmuch as the riots took place at a time when the delegates of the Colonies were assembled in Philadelphia for the purpose of drafting the Constitution, there can be no doubt that the furor of the recent events aroused grave misapprehensions in the minds of many as to the wisdom of entrusting the government to the hands of an unselected body of people which in their opinion could be equated with the 'mob.'"[4] Actually the constitutional convention gathered in Philadelphia in May 1787. The delegates completed their work on September 17, and on the 28th, Congress resolved to transmit it to the legislatures of the several states, to be laid before special conventions elected in each state. By the beginning of April, 1788, the Constitution had been ratified by six states.[5] In New York, however, where those opposed to ratification—the Antifederalists—were particularly strong, the legislature had resolved that the elections for the state convention be held on the last Tuesday in April.[6] On April 13–14, therefore, at the time of the Doctor's Riot, the elections were only two weeks off, the political situation was acute, and New York was a key state. It becomes pertinent, then, to inquire whether this riot, an important incident in American medical history, had any political influence.[7]

Unquestionably there were among the Federalists men opposed to democracy, and strongly in favor of law and order. Alexander Hamilton and John Jay, to name two who took sides against the mob, were among them, but their opinions on this subject had been formed long before April 13, 1788. Jay, in fact, rose from his sickbed following the rather severe wound he re-

[4] J. C. Ladenheim, "'The Doctors' Mob' of 1788," *J. Hist. Med.*, 1950, *5*, 39.

[5] Carl Van Doren, *The Great Rehearsal*, New York, Viking, 1948, pp. 9–204, *passim*.

[6] Jonathan Elliot, *The Debates in the Several State Conventions on the Adoption of the Federal Constitution*, Philadelphia, Lippincott, 1861, 5 vols. (vol. II, pp. 205–206).

[7] For a full account of the struggle for the ratification in New York, see E. Wilder Spaulding, *New York in the Critical Period 1783–1789*, New York, Columbia, 1932, pp. 192–276; and Clarence E. Miner, *The Ratification of the Federal Constitution by the State of New York*, New York, Columbia, 1921.

ceived in the riot to write *An Address to the People of the State of New York;* it was a strong argument in favor of the proposed Constitution, but its tone was calm and temperate, and in spite of his recent experience it made no mention of the dangers of mob rule.[8] In the debates at the New York state convention, held in Poughkeepsie from June 17 to July 26, 1788, there were occasional remarks on the evils of democracy and the danger of entrusting the government to the untrammeled will of the people, but they came from both parties.[9]

Among the leading men who endeavored to stop the riot, James Duane, Mayor of New York, Robert R. Livingston, Chancellor of the state, John Jay, and Alexander Hamilton were all Federalist delegates to the Poughkeepsie convention from New York City. But Governor George Clinton, who called out the militia to suppress the riot, was the leader of the Antifederalists; badly defeated in the New York City elections, he attended the Poughkeepsie convention as a delegate from Ulster County. He was no man to brook mob rule and had previously co-operated with the government of Massachusetts in suppressing the agrarian-debtor revolt led by Daniel Shays which had convulsed the Bay State late in 1786.[10]

On the other hand, most of the members of the mob seem to have been drawn from the working-class section of the city's population, and therefore from the most numerous. Yet when the elections took place at the end of April, on a basis of free manhood suffrage, the Antifederalists were overwhelmingly defeated. From a total of 2,838 votes cast, John Jay, the top man on the Federalist slate of nine, received 2,735, and the lowest Federalist received 2,651. Governor Clinton led the Antifederalist slate with only 134 votes, and only two others of his party received over 30. Nor can this be attributed to any failure of at least some of the "mob" to vote, for in the concurrent elections for the state Assembly, in which the usual property qualifications applied, the total vote was only 1,650.[11] Apparently neither the anti-mob activities of the city's leading Federalists nor the charge of Chief Justice Richard Morris (who was also a Federalist delegate to the Poughkeepsie convention from New York City) to the Grand Jury emphasizing the power of the law had turned the mob against the Federalists.[12]

Finally, we may note that neither political party held a monopoly on riot-

[8] Henry P. Johnston, ed. *The Correspondence and Public Papers of John Jay,* New York, Putnam's, 1891, 4 vols. (vol. III, pp. 294–319); Frank Monaghan, *John Jay,* New York, Bobbs-Merrill, 1935, pp. 290–293.

[9] Elliot, *op. cit.,* vol. II, pp. 253–254, 312, 317, 359.

[10] *New-York Packet,* April 25, 1788; E. Wilder Spaulding, *His Excellency George Clinton, Critic of the Constitution,* New York, Macmillan, 1938, pp. 164–165.

[11] *New-York Packet,* May 30, 1788.

[12] Sidney I. Pomerantz, *New-York an American City 1783–1803,* New York, Columbia, 1938, p. 97, states that "the tradesmen and mechanics, lured by the prospect of better business, lined up behind the commercial, financial, and speculative interests in their successful struggle for the ratification of the Constitution." Mayor Duane's charge to the jury, which Dr. Ladenheim quotes extensively, came after the elections.

ing. On July 4, 1788, while the Poughkeepsie convention was still sitting, a Federalist procession encountered an Antifederalist group on a narrow street of that Hudson River town; "after a few words, a general battle took place, with swords, bayonets, clubs, stones, &c. which lasted for some time, both parties fighting with the greatest rage . . . ."[13] When the news of ratification reached New York City on July 26, a Federalist mob stormed the office of the Antifederalist *New York Journal* and wrecked the press.[14]

Dr. Ladenheim points out that ten days after the Doctors' Riot, the tumult had largely subsided. On April 25, the Federalist *New York Packet* published a full account in order to quiet the "exaggerated accounts of the late riot in this city . . . ." While there is no doubt that the problem of law and order as a whole was one of the basic forces leading to the substitution of the Constitution for the Articles of Confederation, and that the more democratical elements tended to oppose the Constitution, it would appear that for all practical purposes Thomas Jefferson was correct in writing of this particular riot that "politics had nothing to do with it."[15]

Cambridge, Mass. JOHN B. BLAKE

First Use of the Laryngoscope in the United States

The laryngoscope was developed and popularized in Europe by Türck and by Czermak in 1857 and 1858. The first published account of its use in the United States was by Hugo Stangenwald in 1860.[16] However, at a stated meeting of the New York Academy of Medicine held on March 6, 1861, Dr. Ernst Krackowizer made the following comments:[17] "I have very little doubt but that I was the first person in this country who saw the vocal cords in a living subject. I sent for this instrument in 1838 [this must be a misprint for 1858] and very soon after I had a case where I had an opportunity to use it. The patient was a gentleman from Texas, who suffered from tuberculous disease of the larynx and lungs. After frequent and rather prolonged sittings, I succeeded in seeing the vocal cords. I was enabled to state that there was no ulceration of the parts present, but that there was stenosis of the cartilages from immobility in their joints. I used the reflector which was first constructed by Sambelleider [the correct name is Semeleder], one of the physicians of the Hospital of Vienna. Finding the use of that apparatus quite inconvenient on various accounts, I had one constructed two years ago by Otto and Reynders, and with which the one claimed to be the invention of Mr. Tiemann is identical. I do not think it necessary to depress the tongue by the use of an instrument, for the patient can do it himself with his finger. Finding that I could get along without the spatula, I gladly dispensed with it."

[13] *New-York Packet*, July 11, 1788.
[14] Pomerantz, *op. cit.*, pp. 102–103.
[15] Quoted by Ladenheim, *loc. cit.*, p. 39.
[16] Stangenwald, Hugo. "The laryngoscope of Prof. Czermak," a paper read before the New York Medico-Chirurgical College. *Amer. med. Mon. N. Y. Rev.*, July 1860, *14*, 15.
[17] *Bull. N. Y. Acad. Med.*, 1862, *1*, 162.

Dr. Douglas then remarked: "The first instrument brought to this country aside from the one referred to by Dr. Krackowizer was by Dr. Stangenwald, who read a paper upon the subject more than a year ago before the Medico-Chirurgical College."

A letter of Dr. Krackowizer's, dated December 24, 1858, giving a complete case report of the first patient whom he examined with the laryngoscope, has been preserved. It apparently concerns the same patient mentioned at the Academy meeting. The letter is in his handwriting, in German script. Its translation follows:

New York, December 24, 1858

Dr. Herff
San Antonio, Texas.
Dear Colleague,

Mr. Oswald, the story of whose illness you know as well, if not better than I, became acquainted with my friend Dr. Shnetter of New York, during his stay at Munde's sanatorium. Shnetter made a diagnosis of pulmonary emphysema resulting from laryngeal stenosis. Since he knew that I had just received a laryngeal mirror, together with an illuminating apparatus (Semeleder's) from Vienna, he advised Mr. O., who was traveling through New York, to have himself examined by me. On examining the opening of the larynx with my forefinger I found it (as I then believed) narrowed by granulations; furthermore there was emphysema of both lungs, particularly of the lower lobes. I believe that in addition one must assume the presence of moderate and quite uniform cylindrical bronchiectasis in the upper lobes, in view of the retraction of the supra and infraclavicular regions, and of the marked consonance of the tracheal sounds in this region, associated with a normal percussion note.

Mr. O. entered the sanatorium of Dr. Lowenthal, and I proposed to cauterize the glottis with a solution of silver nitrate (℈ad ℥ī). This was begun on November 13th, and repeated every other day. Inspection with the laryngoscope, because of my inexperience, did not give results to confirm or justify the diagnosis. For a long time, the attempt to fix the base of the tongue and to pull it forward with Green's spatula made it difficult to obtain a view of the larynx. The pull and pressure of the spatula, far from controlling the tongue, made it draw back vigorously, and this of course depressed the epiglottis and made it difficult to view the glottis. When I stopped using the spatula, and Mr. O. either allowed his tongue to rest quietly in his mouth, or else protruded it, it became very easy to see the posterior surface of the epiglottis, the false and true vocal cords and the entrance to the ventricles of Morgagni. Drs. Shnetter and Lowenthal were often present during the laryngoscopic examinations and were able to get good views of these structures.

Our treatment did not give any relief to Mr. O's subjective symptoms. At first there seemed to be some improvement, inasmuch as early in December he was able to climb stairs to the third story without resting, and his breathing, when he reached the top, was hardly accelerated or difficult. His voice became clearer, his eyes more lively, and his lips assumed a normal color. Digital examination, as well as examination with the mirror on December 10th, revealed disappearance of the granulations. Since I believe that such rapid recession of granulations is impossible, I think that we were mistaken, and that a chronic submucosal edema caused a swelling, thickening and folding of the mucous membrane covering the arytenoid cartilages, which gave the examining finger the sensation of granulations. This interpretation is all the more justified because there still is considerable swelling of the mucosa covering the arytenoid cartilages.

Mr. O's condition was more satisfactory from the 2nd to the 12th of December. On the 13th cauterization was resumed. During the next two days his voice became hoarser, and there was considerable dyspnea. During this period the weather was constantly disagreeable.

On the 15th cauterization was repeated. It caused much pain, and the dyspnea became aggravated and quite intense on this and on the following days. On the 15th a whitish piece of tissue 2¼‴ long and 1½‴ wide adhered to the sponge applicator when it was withdrawn. Microscopic examination showed that it was made up exclusively of regular layers of pavement epithelium—therefore the epithelial covering of the true vocal cords. (See *Handbuch der Gewebslehre* von Kölliker, 1852, page 450). The cough became very distressing, the expectoration, usually formed and yellow, became glassy and the voice was lost. In short, the influence of the weather and probably also the cauterization undoubtedly caused an acute catarrh of the laryngeal mucous membrane. With rest and cold compresses these symptoms subsided and on December 18th, the condition was again so satisfactory that a laryngoscopic examination—the last one—could be undertaken. Status: epiglottis, true and false vocal cords, entrance to the ventricles of Morgagni normal. I never was able to look through the chink between the true vocal cords, it always appeared black. The distance between the vocal cords is very slight. The posterior third of the chink between the vocal cords is hidden and covered by two rather dark red swellings that almost meet in the midline (mucosa covering the arytenoid cartilages.)

Inspection with the laryngeal mirror does not explain the hoarseness and the dyspnea. The dyspnea, even though moderate, is so continuous that I doubt that it can be attributed only to the emphysema. There must be a stenosis of the larynx. Is the chronic edema of the mucosa covering the arytenoid cartilages sufficient to explain it? To me it seems not improbable that when the bulging, infiltrated mucous membrane overlies the posterior third of the rima glottidis, the passage of air must be considerably diminished. This pressure would also explain the toneless voice, since the vibrations of the vocal cords must be considerably dampened and restricted by it. Is the slight movement of the anterior part of the vocal cords only apparent because anteriorly they converge to an acute angle? Is it actual, and could it then be attributed to stiffness of the joint between the arytenoid and cricoid cartilages?

These are the questions which I cannot decide without having the patient under longer observation, but which you will solve in the course of time.

If it is true that the laryngeal stenosis is caused only by the edema of the mucous membrane covering the arytenoid cartilages, and if it cannot be relieved by cauterization or other methods, and if the pulmonary emphysema should become dangerous, there is nothing, in my opinion, that may be expected so surely to cause regression of the edema and the emphysema as a tracheotomy. This is also Shnetter's opinion. But here I am giving opinions to which I am not entitled, for my only task is to give you the history of the patient for the period that he was under my care.

Mr. O. will tell you about the various little tricks that make laryngoscopic examination easier for the patient and more rewarding to the physician. He has become a past master in the matter. He will also tell you of the experiments that I have made with the tongue spatula, the mirrors and the illuminating apparatus. The illuminating apparatus that I am sending you is still incomplete, since the bowl exerts a painful pressure on the eye; the part that serves as an attachment for the elastic band, and the joint for the nut should rest on the bony part of the orbit.

I have heard so many notable things about you, dear colleague, that it is a great relief to me to know that Mr. O., with whose fate I am much concerned, will be in your hands. It would be of great scientific interest to me, and would also please Mr. O., if after a time you would give yourself the trouble to let me know the further course of the illness and the results of your examinations and treatments.

Dr. E. Krackowizer

New York, New York

ERNST P. BOAS

Book Reviews

HENRY R. ZIMMER, *Hindu Medicine*. The Hideyo Noguchi Lectures, Vol. VI. Baltimore, The Johns Hopkins Press, 1948. lxxii + 201 pp. $4.00.

IN November 1940 Dr. Henry Zimmer delivered three lectures on Hindu medicine, celebrating the seventh course of the Hideyo Noguchi Lectures at the Johns Hopkins Institute of the History of Medicine. The lapse of eight years which ensued between presentation and publication of the lectures was due first to Zimmer's desire to reorganize them, second to his sudden death in 1943 while still busy with the task of revision, and third to the difficulties encountered by the editor, Dr. Ludwig Edelstein, in combining scattered notes and reorganizing an incomplete manuscript into a volume that would give adequate expression to the author's ideas.

For the painstaking care with which he accomplished this task, Dr. Edelstein deserves the highest commendation. Disclaiming modestly any qualifications for the assignment except a longstanding acquaintance with the author and his work, Edelstein presents, in an ample preface, first a sketch of the man Zimmer as he had come to know him personally over a period of years; second, certain comments and revisions that were found in Zimmer's notes and manuscript, and lastly, a summary of the unfinished final lecture (which would have been Chapter III if Zimmer had lived to complete his work).

In the opinion of this reviewer, one of the most interesting and valuable parts of the preface is the revelation of Zimmer's broad philosophical background and approach to his subject. From the publication of his doctoral dissertation in 1914 to his death in 1943, he manifested a marked interest in Hindu culture as a whole. He was especially impressed by its inner spirit of reliance on myth and intutition, a tendency that contrasts sharply with Western civilization's emphasis on science and reason. Zimmer seems to have developed such a deep appreciation for this spiritual quality that it gave his survey of Hindu medicine a somewhat subjective slant. This is the one aspect of the volume that calls for negative criticism; of which, more later.

The subject matter of the lectures is presented in three sections: (1) a chapter on the general development of medical tradition in India; (2) a chapter on the human body, the Yoga system of breathing, and sex; and (3) an incomplete chapter on *materia medica* and diet. It is difficult to see why this last chapter, even though incomplete, was published as a part of Edelstein's preface, instead of in its logical place as the final chapter of the volume.

Throughout the book all important topics are based on the original Hindu texts: for the early period (B.C.), the Vedic hymns, for the classic period, the three great compilations, Caraka, Suśruta, and Vāgbhaṭa. The usual arrange-

ment for each topic is first an English translation of the Hindu text, then a detailed explanation of the medical factors involved. This procedure results in considerable duplication, but many of the texts, especially the Vedic, are so allegorical in character that explanations are necessary in order to relate them to medicine as it is understood today.

In Chapter 1 there is special need of such explanatory detail, since the subject matter is largely mythological and rather far removed from medical science. But this does not disturb Zimmer's equanimity. He not only accepts it, he defends it—so vigorously that we feel the need of cautioning the reader on certain points. We have no quarrel with his acceptance of the fact that "Hindu classic medicine stems from priestly magic"; this is true of many civilizations. We are surprised at his complaisance over the fact that medicine was still under the spell of religion as late as the seventeenth century. After describing a medical allegory of this period (which reads much like a medieval morality play), Zimmer remarks that "this idealistic attitude is characteristic of Hindu medicine throughout . . . ," and the allegory "reflects faithfully the concept of life which generates the moral and spiritual atmosphere of classic medicine [in India]" (p. 74 f.). Still more surprising is his general defence of mysticism as superior to rationalism. This leads him to give an unjustifiably high rating to primitivism in medicine. For example, in the fragmentary chapter on materia medica (in Edelstein's preface) he suggests that traditional medicine is "a combination of inspiring intuitions, beneficial feats of autosuggestion, and actual results which may be corroborated later by tardy science" (p. lvi). Again, "The authoritative character of the ancient teaching remains an amazing fact not to be taken lightly or to be disposed of on the ground that it sprang from the naive and primitive archaic mind. . . . For the prestige and success of the medical profession and its representatives, the actual results in restoring health or saving and prolonging life, which in India were not computed by statistics, are far less important than their consistency with the general outlook on life characteristic of the various epochs. . . . As long as medicine is in agreement with the general ideas, views, prejudices, and superstitions of its own time and civilization, its actual achievements or shortcomings are of minor importance" (pp. lxix–lxx).

With such easy acquiescence at the prospect of a passively unprogressive medical science, Zimmer ended the last of his three lectures in 1940. The same attitude crops out in some of his earlier writings quoted by Edelstein. As early as 1929 he wrote: "To one who thinks of the abyss of the soul as it is revealed in the Hindu myth, the European world may seem shallow, just as the laughter of the Greek gods—these eternal symbols of rationalism—is shallow as compared to the ambiguous smile of the Hindu deities" (p. xxxv).

Foreign as such ideas are to our thinking, it is, we believe, this sympathetic point of view that makes Zimmer's work so stimulating and valuable

(a sort of counter-irritant) to the modern Western mind. It suggests that we might do well to try and see the mystical East and the materialistic West as they appear to the Oriental mind. For a balanced view, however, one does well to supplement Zimmer with works which we might characterize as less penetrating, but more objective. For example, Julius Jolly's "Medizin" in the *Encylopedia of Indo-Aryan Research,* which is cited by Zimmer, is more factually satisfying. In our own limited experience with the intricacies of ancient Hindu gynecology, we have found more of detailed information in Jolly, and more of interpretation in Zimmer. Over and above all such comparisons and negative criticisms is the regret that a man of Zimmer's broad background in Hindu culture and penetrating insight into the inner recesses of the Oriental mind could not have lived to complete these lectures and many other works on the same intricate subject.

Durham, North Carolina LOREN C. MACKINNEY

RALPH LINTON, Ed. *Most of the World. The Peoples of Africa, Latin America, and the East Today.* New York, Columbia University Press, 1949. 917 pp. $5.50.

THIS is a great human study of societies and races. It points out, through many of its pages, that "the debacle in Europe has thrown the shortcomings of Western civilization into glaring relief." More than that, it makes clear that "while Western technology and science are in demand everywhere, many of the former subjects do not want the rest of Western civilization."

Much of the world is reviewed by competent essayists; they deal with Mestizo America and Brazil; with the south and east, the west and centre, as well as the north of Africa; with the Near East, with India and Pakistan, with Southeast Asia and Indonesia, with China and Japan. This review will lay stress on two of the essays: the one on North Africa by Carleton S. Coon, now professor of anthropology at the University of Pennsylvania, and the one on race relations and policies in southern and eastern Africa by H. J. Simons, lecturer at the University of Capetown. These are the outstanding articles in the book.

What the European destroys in Africa, in satisfying his demands for land and labor, is the territorial homogeneity of tribal society. He weakens the basis of its kinship, political and religious institutions. He upsets the former balance between the human society and its environment, thus giving rise to soil erosion, to widespread and increasing malnutrition, and to much preventable disease. At the same time, a framework for new social forms is created, in which attention is given to education, health, religious institutions, a modern legal system, and a diversified market economy. With all the claim of the white

man to provide for the non-European, yet "the great bulk of the people live in primitive huts, built of wattle and clay, windowless, with no outlet for smoke, and infested with vermin and rodents. . . . Sanitary facilities are seldom found; supplies of pure or even polluted water are inadequate for domestic purposes. In the absence of reliable morbidity statistics, the incidence of various diseases cannot be indicated, but . . . enteric, typhus, plague, leprosy, tuberculosis, malaria, bilharzia, and syphilis are widespread." There are extensive debilitating conditions which prevent the inhabitants from producing at their maximum efficiency. "Practically all the diseases prevalent in the Native Reserves are associated with overcrowding, poor standards of personal hygiene, inadequate sanitation, impure water supplies, malnutrition and general poverty." These are all preventable conditions. It is stated that, in the Reserves, there is an average of one medical practitioner to 21,500 persons. Recent admissions that the migratory system for native labor is "morally, socially, and economically wrong" grow out of a significant change of attitude in the policy-makers of the present century. The change of heart has grown in part out of humanitarian considerations, but chiefly out of the realization that the progressive deterioration of the Reserves and its effect on health standards threaten to deplete the potential labor force.*

Ill health adds a considerable burden to the African's handicap of illiteracy. He does not eat enough to sustain health, and what he eats is often deficient in protein, vitamins, and calcium. All this adds up to a tremendous burden of malnutrition, which is bound to have a calamitous effect on the future labor supply of the country. The undernourished African falls prey to a great variety of tropical diseases. "Malaria occurs in most parts of South Africa, while sleeping sickness, hookworm and other diseases abound." Syphilis and tuberculosis seem to have been unknown in South Africa before the European era. Most African diseases are bred out of the African's poverty. "Unless standards of nutrition, housing, sanitation, and education are raised far above existing levels, very little headway can be made against diseases." So, too, health services are grossly inadequate in relation to African needs. "As recently as 1938, in a relatively advanced territory like Southern Rhodesia, no medical facilities were available for about a quarter of the African population. In Northern Rhodesia, at the same period, more than half the territory was without medical attention."

In spite of all this inadequacy, "health services represent a great advance over the tribal methods of treating diseases." At the same time, while the traditional hut in the Reserves was primitive, yet it possessed an aesthetic charm, and did avoid overcrowding, while the frequent rebuilding of huts reduced the extent of vermin infestation. All these qualities are lost where the native villages are required to have permanent sites. Though contrary to tribal rules, adults are now increasingly obliged to share their huts with young persons,

* Cf. with early sanitary movement in Great Britain and United States [Ed].

which, in the absence of sanitary controls, becomes a menace to health. The African has, indeed, leaped into an alien world, ruled by men of a different race, whose customs and restraints, together with the neglect of obvious forms of social care, are hindering his real advance in world society.

Professor Coon's analysis of North Africa is illuminating. He writes of Berbers and Arabs: "It is apparent that the city dwellers are a breed apart from the country folk, and particularly different from the mountaineers. The country men spend their lives in the sun and open air, and habitually walk several miles each day. They are bronzed and erect, with strong fingers and bulging leg muscles. Their faces are lined, and their eyelids narrowed from the glare of the sun. When away from home they glance about them keenly, always on the alert for trouble." He gives us a vivid picture of the organization of North African cities, each of them surrounded by a wall with several gates. After describing the homes of the wealthy and the poor, he points out how eager the city women of North Africa are to learn about the world outside the family walls, and how they crave to be told stories. No one should miss this great chapter by Coon in which he pictures with such appreciation their commerce ("as with everything else these people do, it is an art"), their gossips (the porters and the barbers, as well as the eunuchs), and the religious life of the communities.

Bascom, dealing with West and Central Africa, appears to write, at several points, with considerable criticism of the missionary. He asserts that "missionaries have been partly responsible for the weakening of the family"; and that a new system of social stratification has sprung up, with the colonial administrators at the top, and the various branches of forestry and medicine, etc, next below, with "the rank of missionaries generally falling below both these groups." If the question were put to the missionaries themselves, it is more than likely that they would assert their indifference to such external differentiations. One would be tempted to inquire whether the abiding stature of a man like Dr. Albert Schweitzer of French Equatorial Africa would suffer to any degree whatever because of such artificial stratifying. One would like to inquire, also, of the leaders of education in the Belgian Congo, in the Gold Coast, and in Nigeria (where a university medical college has recently come into being), as to the assertion: "Most literate Africans believe that the good admittedly done by some missionaries is not sufficient to justify the presence of foreign missions in Africa." Is it not the church groups in South Africa that are organizing most effectively against the ruthless *apartheid* policy of the present conservative government there?

In his careful study of China, Dr. Francis L. K. Hsu draws attention, wisely, to the rapidly changing aspects of family life. His section on Religion in China is particularly illuminating, especially when he describes the religious practices in certain rural areas of southwest China. He says truly that "to bear

permanent fruit in China, the missionary movement must have indigenous financial support." The four defects he points out in the missionary activities in China should be carefully noted. It is very doubtful, however, whether Dr. Hsu is correct in saying that "with a few outstanding exceptions, those who can find suitable posts in their home countries do not go abroad." Such an assertion would require analysis of thousands who have gone to serve in China and elsewhere in response to an inner call. It is doubtful, also, whether Dr. Hsu's claim that "there has been a drop in the quality of missionaries going out to China in the last century." If he would study the requirements, he would discover how rigid they are, in respect to both mental and physical qualifications, for every candidate sent out from the West.

Administrators and teachers, doctors and agriculturists in "most of the world" will do well to own and study this important book.

New York, New York EDWARD H. HUME

EMANUEL BERGHOFF. *Max Neuburger. Werden und Wirken eines österreichischen Gelehrten,* mit einem Geleitwort von Henry E. Sigerist (Wiener Beiträge zur Geschichte der Medizin, herausgegeben von Dr. Emanuel Berghoff, Band III). Vienna, Verlag Wilhelm Maudrich, 1948. xi + 144 pp. Illus. Ö. S 40.—

Festschrift zum 80. Geburtstag Max Neuburgers mit 91 internationalen medicohistorischen Beiträgen (Wiener Beiträge zur Geschichte der Medizin herausgegeben von Dr. Emanuel Berghoff, Band II). Vienna, Verlag Wilhelm Maudrich, 1948. xv + 491 pp. Illus. Ö. S 100.—

ON DECEMBER 8, 1948 Max Neuburger celebrated his eightieth birthday. The event was significant not only because it permitted a host of friends, colleagues, and admirers to pay homage to one of the *Altmeister* of medical history, but beyond this because Max Neuburger in his person represented a tradition in the teaching of medical history which had existed in Vienna for more than one hundred years.

The teaching of medical history in Vienna dates from the beginning of the nineteenth century. Separate lectures on the history of medicine were first given in 1808 by Heinrich Attenhofer. A year later, Joseph Eyerel, a student of Maximilian Stoll, also received permission to teach the subject. In 1811 Andreas Wawruch began to give a course devoted particularly to the history of epidemics. But not until 1833, when Romeo Seligmann obtained the *venia legendi,* was the teaching of medical history at Vienna firmly established. Seligmann's endeavors initiated a tradition which continued without interruption for a century. Upon his retirement in 1879, Seligmann was succeeded by Theodor Puschmann, who occupied the chair of medical history for two dec-

ades until 1899. Max Neuburger followed him as professor in 1904 and remained active until forced out by the Nazis.

Berghoff presents a brief biography of Max Neuburger with the emphasis essentially on his activities as a medical historian. It is good to have Neuburger's biographical data collected in one volume, but the most interesting single item is the reproduction of one of Neuburger's lectures. His achievements may be summed up in the statement that he is an outstanding teacher, a masterful writer of medical history, and the founder of a unique Institute for the History of Medicine. The volume contains a list of Neuburger's publications.

It had originally been planned to issue a *Festschrift* on the occasion of Neuburger's seventieth birthday in 1938, but the occupation of Austria and the events of the subsequent years prevented the publication of the papers that had been collected. A decade later on the occasion of Max Neuburger's eightieth birthday these papers augmented by a number of new contributions were issued by Berghoff as a *Festschrift*. A volume of this kind can hardly be discussed in detail. The ninty-one contributors range widely in time and space and there are many papers of considerable interest. There will be something to hold the attention of every reader. It is a pleasure to welcome and to recommend this tribute to a great medical historian.

GEORGE ROSEN

Volumen Medicinae Paramirum of Theophrastus von Hohenheim, called Paracelsus. Translated from the original German with a Preface by Kurt F. Leidecker. Supplement No. 11 of the Bulletin of the History of Medicine. Baltimore, Johns Hopkins Press, 1949. vi + 69 pp. $1.75.

THE CHARMING little volume with which Paracelsus opened his attack on Galenic medicine contains all the basic tenets which later he developed into his system of unorthodox biochemistry, and the present translation gives a good account of the eccentric style and mannerisms which he used to convey his message. Other works of Paracelsus may be better sources for those who wish to study the general state of medical and chemical knowledge in the sixteenth century, but there is hardly any better approach to Paracelsus the man than through the *Volumen Paramirum*. It can be read as a document of Renaissance philosophy, and a modern reader's enjoyment is not constantly marred by prescriptions, which even at that time were superstitious relics, such as abound in other Paracelsian writings.

Since this volume is apt to interest students of history beyond the narrow circle of specialists, a somewhat more generous preface and ampler annotations might have been helpful. No attempt has been made to explain the word *Paramirum* or to summarize the views against which Paracelsus directed his invective. To students not familiar with the situation, the statement that Paracelsus

"rejected speculation in favor of experience" must appear bewildering in the light of some passages of the text (Paracelsus, incidentally, favored "experimentum ac ratiocinium"). In some cases, the difficulties of presenting a readable translation made it necessary to gloss over terms which might indicate or clarify Paracelsus' position. On page 13, for instance, the words "complexioniert und genaturt" are excellently rendered by "disposed and endowed," but a note on "complexion" clearly was called for. The term definitely places Paracelsus.

The absence of such aids would not be felt so much if Paracelsus' own words were less uncouth or if the translation could make them more precise. Unfortunately, this is not possible. In the above passage, for instance, Paracelsus says that Adam and Eve acquired their bodies "durch das Geschoepf," which is poor German and leaves the meaning in suspense between "through creation" and "as they were complexioned"; since the translator had to say "by creation," the force of Paracelsus' argument is weakened. (This reviewer cannot suggest any better translation.) No one who has not tried to translate Paracelsus knows the quandaries with which Dr. Leidecker must have been faced, line for line, or can fully appreciate the job he has done. In most cases, it seems, he has sacrificed other considerations to readability. This choice will make the work accessible to a wider public, and anyway the particular experience of reading Paracelsus' pre-Lutheran, unliterary, and ungrammatical Swiss dialect, and the double entendre which such unfixed language affords him, must be lost in any translation. But the characteristic Paracelsian coinings had to go, too, which is a pity in such cases as "pagoyum" (composed of pagan and goyim, meaning a pagan science permissible to a Christian, a problem which bothered Paracelsus not a little).

Since translators will always quarrel, the following points of dissent should not be taken as a qualification to this reader's expression of gratefulness for the English text. Paracelsus divides doctors into five schools: *naturales, specifici, characterales, spiritales,* and *fideles. Naturales,* against whom the brunt of his attack was directed, clearly are the Galenists, and hence the translation "nature-healers" seems to point in the wrong direction; *characterales,* unfortunately, comprises all sorts of practitioners of character magic, such as palm reading, geomancy and so on; the translation, "those who believe that recognition and proper designation heal," therefore, is decidedly too charitable to Paracelsus (p. 3). On page 23, the translation says "systemic diseases (Leibkrankheiten, a very good rendering in this context) . . . concern the vital liquors"; but Paracelsus said "liquorem"; this excludes the Galenic inferences of the plural form, which otherwise might have been justified.

Dr. Leidecker still dates the *Volumen Paramirum* "around 1520"; in his later years, however, Sudhoff who was responsible for this opinion, inclined to follow others in dating the *Volumen* closer to the other Paramiric essays.

New York, New York HENRY M. PAECHTER

FRANCESCO PELLEGRINI. *Fracastoro.* (Monografia N. 3, Collana di vite di medici e naturalisti celebri.) Trieste, Zigiotti Editore (1948).

THIS monograph by Pellegrini, published at the end of August 1948, is noteworthy for the wealth of information regarding the life of Fracastoro and for the detailed analysis of all his works. Having been born in the same beautiful city, Pellegrini probably found it easier to approach the complex personality of his subject; in other words, Verona and its suburbs which inspired the poetry of Gerolamo also helped Pellegrini to understand him. It is difficult to say whether Pellegrini's interest and enthusiasism center more on Fracastoro the physician, or the poet, or the philosopher—or whether he ever posed this question to himself. In any event his aim was didactic, and his subdivision of the work into chapters in a sense breaks the personality of Fracastoro in fragments. The style is fluent and picturesque, especially in the chapter on the life of the Veronese master where his outstanding personality becomes more clearly outlined against the background of the stormy Cinquecento, shaken by wars and strife but reaching out toward the new learning. In reliving Fracastoro's experience in the Medical School at Verona (Padua?), and by following his first significant friendships which aroused his enthusiasm toward one or another field of study, we overcome the obstacles of time and circumstances and are able to understand his search for beauty and truth. His letters are of both great literary and scientific value; and through them we are able to follow his correspondence with the other students of the time. His words, his poems, and his inquiries spread out over all that section of Italy where other people shared the awakened desire for knowledge; Fracastoro was in a sense the coordinator of this knowledge.

In his monograph Pellegrini brings to light the versatility of Fracastoro, as he reviews carefully all the works showing the multifaceted interests of his subject: astronomer, mathematician, geographer, naturalist, musician, chemist, but especially physician, investigator, and philosopher. All these aspects of his personality form a harmonious whole, with a focus ever on the truth for which he was constantly searching. But Fracastoro had also the gift of poetry; and he used his skill to express in fluent and pleasant verses even those scientific subjects which seem hardly adaptable to such literary form. From the analysis of the life and the philosophical and scientific thought of the Veronese, Pellegrini proposes to prove the Christianity, or rather the Catholicism, of the great savant. On this point the author is so impassioned that he denies even minor doubts regarding Fracastoro's faith. He never questions his own interpretation of Gerolamo's deepest feelings and he maintains that "some doctrines of his Master (Pomponazzi) must have been repugnant to the young philosopher . . ."; and he denies, moreover, that in Fracastoro's life there ever was a conversion, because this would imply a diversion—however temporary—from the dogmas of the Church. This great savant, who through the work of his mind and the speculation of his

thought may truly be considered a precursor of the great biological discoveries of the nineteenth century, is represented as being so held in medieval terror by the dogmas of religion that he did not even attempt to understand, let alone explain them. We may therefore ask whether Fracastoro could be considered such a great man, if it were not accepted—at least in general terms—that there is no irreconcilable opposition between his scientific principles and his devotion to Catholicism. Moreover, is not the Aristotelian philosophy, espoused by the Church, the burden under which Fracastoro labored without hope? Some authoritative students intimate that the Santo Uffizio may have objected to the printing of some of the works of Fracastoro. Although it is possible to question the authenticity of the dates in which such papers were written, still it seems justifiable to believe that Fracastoro had some doubts. Certainly the Veronese Master appears even greater if we may think of him as having been free from any dogmatic limit in his thinking. The reader will probably care little as to whether Fracastoro was constantly orthodox in his Catholicism, but he will enjoy the thorough and complete narrative of the life and vicissitudes of this great thinker and of his friendships with other illustrious contemporaries; and also the analysis of his works which throw light on his prophetic genius, his poetic skill, his logical thought, and above all his passion for knowledge. In this Pellegrini has fully achieved his purpose.

Milan, Italy MARIA GIOVANNA DE LUCA MARGARIA

LEON J. WARSHAW. *Malaria, the Biography of a Killer*. New York, Rinehart & Co., 1949. 348 pp. $3.75.

AFTER a short introduction on the history of malaria, mostly in America, the author tells the fascinating story of our knowledge of malaria as developed by Laveran, Manson, Ross, and Grassi. He deals in detail with the great anti-mosquito campaigns of Ross, Watson, Gorgas, in Brazil 1930–41, and during World War II. He furthermore reports the story of Cinchona and the modern anti-malarial drugs, and ends with short chapters on malaria therapy and malaria in World Wars I and II.

This book is considerably better than its smart title. It is also considerably better than most popular books in medical history I have seen recently. Of course, it is not of too much use to people more deeply interested in medical history, and it is not meant to be. The author does not use documentary sources, but second-hand information. He takes the word of his informants that they have interpreted the sources right, and the reader has to take his word that he understood his (unidentified, except for a terminal bibliography) benefactors correctly. But at least he usually chooses his informants with discrimination.

As is obvious from our summary, the author spends very little time on the history of malaria properly speaking. This is all the better, as in this field his

judgment seems somewhat blurred by over-enthusiasm. A statement that "the eradication of malaria in India would convert that nation into one of the most prosperous in the world," or the author's "polemic" against the "poverty and ignorance" theory of malaria seem naive. (In this connection I recommend perusal of J. A. Andrew's, "What is Happening to Malaria in the U. S.?" *Amer. J. publ. Hlth.*, 1948, *38*, 931.) I am afraid the author would have a hard time actually to prove such hyperbolic statements as: "*More than any other single factor,* malaria is responsible for the underdevelopment of vast portions of this globe and for keeping more than half the earth's population in misery and wretchedness," or "Of *all* the diseases known to man, none has had more significant effect upon the history of the world than malaria." [Italics mine. E.A.]

In calling Lancisi "the most prominent physician of his era" the author must momentarily have forgotten that Lancisi, highly as we might appreciate him now, had the misfortune to be a contemporary of Boerhaave. That C. J. Finlay is not mentioned in discussion of the discovery of the transmission of yellow fever is a regrettable omission. The same holds true for the omission of Magendie and all the leading French clinicians of the 1820's when credit is given for the introduction of adequate quinine doses. They preceded Dr. Warshaw's heroes.

But these are minor strictures. As far as popular books go, this is a good one. That it devotes about one-sixth of its space to discussion of the still little-known experiences with malaria in World War II, is a definite asset.

Madison, Wisconsin ERWIN H. ACKERKNECHT

Anniversary Volume for Abraham Levinson; Studies in Pediatrics and Medical History. Solomon Kagan, Ed. New York, Froben Press, Inc., 1949. 365 pp. $6.00.

ONE of the German customs which we could profitably follow is the publication on appropriate occasions of *Festschriften* like this one for Dr. Abraham Levinson. A committee of his friends consisting of Drs. Solomon R. Kagan, Isaac A. Abt, Reuben Friedman, and Max Neuburger invited forty-eight friends and well-wishers to contribute articles to this volume. The volume is made up for the most part of papers on medical and pediatric subjects. A smaller group deals with historical subjects. All these articles are interesting, and some are notable contributions to pediatric literature. Samuel X. Radbill's paper, "The Pediatrician Chooses a Bookplate," particularly delighted this reviewer because he has been interested in bookplates ever since 1918, when he was given a copy of Roland G. Curtin's booklet, "The Bookplates of Physicians with Remarks on the Physician's Leisure-hour Hobbies." *Festschriften* often contain many of the best medical articles; for example, Osler's "Visceral Lesions of the Erythema Group" was prepared for the Jacobi *Festschrift* (1900).

To paraphrase Osler's message to Lord Horder on his knighthood, the

friends of Dr. Levinson are glad that this volume with its recognition of his contributions to pediatrics "has come whilst the sun is on his face."

Durham, North Carolina WILBURT C. DAVISON

GEORGE R. MOON. *How To Become a Doctor*. Philadelphia, The Blakiston Co., 1949. ix + 131 pp. $2.00.

THIS little book is designed to meet one of the most urgent needs of youth today —guidance in the selection of a career in one of several medical fields to which students may aspire. Throughout schools and colleges there is a glaring lack of wise and courageous counselling of young men and women as to careers which they *should* or *should not* try to enter. Instead of careful and systematic review of possibilities and qualifications, the student is too often met with disappointment as a result of following uninformed trial-and-error procedure. Hence, Mr. Moon's guide book evolved from his wide experience at the University of Illinois should be of value not only to students, but also to their teachers. Both groups should read and reread it and then keep it on hand for reference.

Actually, the selection of the title for this book is somewhat misleading, for to the average person it means "How to Become a *Medical* Doctor." One of our chief problems these days is the overemphasis on the desire to attain the medical degree, to the relative neglect of other medical careers deserving equally serious consideration. Literally thousands of students are being frustrated in failing to gain admission to medical schools, because excessive numbers of them have not given sufficient consideration to allied professions.

Since the subtitle of the book explains that other callings are being considered, including dentistry, veterinary medicine, pharmacy, optometry, chiropody, occupational therapy, hospital administration, medical illustration, and other scientific fields, perhaps the title might better have been, "How to Choose a Medical Career." It is supremely important for psychological reasons, as well as those of competence and success in the chosen field, that the choice should be the *primary* one for the student applicant. To attain this objective, guidance should begin in high and even grade school, for a surprising number of career decisions are made before the student enters college. For those who have chosen wisely, Mr. Moon's book will be of immense value in arrangement of college programs, choice of college and professional school, putting the "best foot forward" in making applications, realizing that there are other important qualifications besides grades, and facing the special problems to be encountered in various medical professional schools. Among the latter are those concerned with tuition costs, scholarships and loans, student employment, health, marriage, and fraternities. One could wish that Mr. Moon's book might be followed by another and enlarged edition devoting more space to the allied professions to which he gives a

total of only forty pages, compared to eighty-six for "medicine" alone. None the less, this publication is unique in its field, is concise, easily readable, and should be in the hands of every student who is considering any phase of medical study.

Brooklyn, New York JEAN A. CURRAN

JACQUES M. MAY. *Siam Doctor*. Garden City, New York, Doubleday & Co., 1949. 255 pp. $2.75.

DR. MAY went to Siam and Indo-China with his Paris doctorate of medicine and made thoroughly good in every sense of the word. The only thing that disappoints this reviewer is the necessity that the publisher appears to feel—that all publishers appear to feel—when describing something overseas. It looks as if they must insist on catering to an imagined public taste for "exotic adventures." Dr. May has written something far more significant than the blurb on the dust jacket would lead you to expect. Even though some of the stories are delightfully amusing, the writer has given us a valuable study of human behavior and of tribal ways in the Far East. For example, when he asked a patient in Siam to define his pain more precisely, the answer was nearly always the same: "The evil winds are blowing in my body, probably at cross-purposes, which causes them to enter at the wrong places, and go out at the wrong exit, making me feel utterly uncomfortable, and—if the gentleman of the West does not give me all his attention—forcing me to return soon to my ancestors after having been cremated." There is a clear-cut story of a type of belief, one for which we should all be grateful. Dr. May has proved himself an anthropologist indeed.

The most memorable part of the book starts with Chapter XV, when he moved to Indo-China. Thus, when he describes the people of Laos, "the meek and charming people," he shows keen observation when he gives their views on Buddhist teaching about anatomy. Many of their practices derive from China, as in the method of variola inoculation:

> To treat smallpox, the Laotians prepare a vaccine by grinding the crust of variolic pustules with feathers from chickens. They spread the mixture to dry in the sun, possibly reducing the toxicity of the virus. The powder is not inoculated but sniffed resulting in an immunity in some people, greater susceptibility in others.

While the method described links the people to the old ways of inoculation in China, their fear of vindictive spirits links them far more definitely to the primitive tribes of New Guinea or of some parts of Bantu Africa. The best chapter in the book is "Jungle Practice," Chapter XVII. Here are stories of the fight against cholera, plague, and smallpox. "Often," said an old resident, "it was cholera that stopped us. There are endemic cases in spots, and a sweeping epidemic every ten years—like a clock. I have seen three since I've been here and I am expecting the fourth any day. In the early vaccination days we knew there

was an epidemic when, upon entering a village, we saw white threads on the doors of huts to keep out evil spirits. . . . Through an open door we could see the decaying corpse of a man, woman, or child, resting in a hollow tree on the earthern floor. If the body was that of a man, there would be plenty of rice, tobacco, and primitive weapons around the casket, so that his spirit on awaking would find everything it needed." A little later, Dr. May describes how they used to fight smallpox:

> One need only mix the bile of a python with some leaves of cubeamiliea and add the seeds of a plant called klem chaucharan. That was, of course, the remedy for pustules that appeared on your stomach. If they broke out first on your face, the remedy was a paste made of old paper and the root of cdalpamby, ground together with a sacred seal.

The description of a Tonkinese peasant is vivid:

> He is not born with a silver spoon in his mouth. His life for generations has been a close-knit chain of epidemics, floods, famines, wars, and devastations by bandits or tigers, with the few happy highlights of his marriage party, the festivities that went with some neighbor's death, and the annual New Year's rejoicing.

Dr. May has written something more telling than a travel book. He has observed accurately and told of his observations vigorously.

New York, New York EDWARD H. HUME

MORTON THOMPSON. *The Cry and the Covenant.* Garden City, New York, Doubleday & Co., 1949. 469 pp. $3.50.

STUDENTS of medical history, though acquainted with the story Mr. Thompson tells, may well be interested in rereading it in this deft fictionalization. Here, with all the blanks left by history neatly filled in by the novelist, is the tragedy of Ignaz Philipp Semmelweis, the Hungarian who in 1847 introduced the use of antiseptics in the Lying-In Hospital of Vienna. It has long been a moot point how much praise should be accorded to this worker in the dark who thus early struck on a doctrine closely related to the germ theory of disease and from that doctrine evolved a method of eradicating the scourge of childbed fever. This much is certain, that the neglect and abuse which Semmelweis suffered during his life, the scorn with which his doctrine was greeted by the greater part of the medical profession, add to the debt which humanity owes to his memory. This novel, bringing the name of Semmelweis to a circle of readers wider than a biography could in all probability win, may be welcomed as paying a part of that debt.

Mr. Thompson has done an extremely competent job of weaving his story around the established facts of Semmelweis' life. He is not always absolutely scrupulous in his rendering of those facts, however. To give a few instances, Semmelweis went to Vienna in the autumn of 1837, not 1836; Hebra's second

article on the Semmelweis discovery appeared in April, 1848, not December. Semmelweis was made aspirant to the post of assistant in the summer of 1844 and was not appointed provisional assistant until February 1846; he became Assistant in the First Clinic of the Lying-In Hospital in July 1846. Mr. Thompson represents him as becoming provisional assistant in August 1844, and assistant in February 1846. It seems carping to dwell on such minor deviations as these, but the novelist has, on the whole, done such excellent work that one cannot help wishing it quite perfect.

In the various interpolated passages which provide a background of political, medical, and economic events, Mr. Thompson is also guilty of misstatements. The fall of Napoleon followed, did not precede, the year 1812. John Hunter's 1786 pronouncements on venereal diseases bear little contemporary relationship to the year 1834. Tennyson in 1840 was certainly not a hidebound reactionary writing "doggedly of medieval legends." Karl Marx had not yet met Engels in 1840, so that they could hardly have been preparing to write the *Communist Manifesto* before or during that year. Another objection to these historical passages is their somewhat inflated style, particularly marked in such usages as "king" as a verb, in such phrases as "compact weapons of comprehension." Bombast is not wholly absent from other parts of the book, and one meets too often with sentences like the following: "In Treviso the red wine foamed but in Venice the Basilica of St. Peter pressed its age upon their mouths and they were silent." In general, however, the narrative style is even and easy, and the conversational passages remarkably well handled.

Mr. Thompson's interpretation of the character of Semmelweis is for the most part in accord with what we learn of the man from biographies and memoirs, though he attributes to his hero a clownishness, sometimes naïve, sometimes deliberate, which does not always ring true. He does succeed in arousing the reader's sympathy for this scientist whom the world rejected, and he presents, in terms the layman can readily comprehend, a just and complete account of Semmelweis' great achievement in the fight against puerperal fever. Despite its minor flaws, the novel is one of compelling interest.

New York, New York ELLEN F. LIMOUZE

NOTES ON CONTRIBUTORS

ODIN W. ANDERSON, Ph.D., is a member of the Department of Clinical Preventive Medicine at the University of Western Ontario (Faculty of Medicine) where he is an Associate Professor in Charge of the Social Aspects of Medicine.

JOHN B. BLAKE is a graduate student in American History at Harvard University.

ERNST P. BOAS, M.D. is Associate Physician at Mt. Sinai Hospital, Assistant Clinical Professor of Medicine at the College of Physicians and Surgeons of Columbia University, and Chairman of the Physicians Forum for the Study of Medical Care.

DENIS I. DUVEEN, Fellow of the Royal Institute of Chemistry and Member of the Royal Institution, recently issued a catalogue of his library under the title, *Bibliotheca alchemica et chemico: an annotated catalogue of printed books on alchemy, chemistry and cognate subjects* (London, E. Weil, 1949).

JOSEPH T. FREEMAN, M.D., is an Associate in Medicine, Women's Medical College of Pennsylvania, Fellow of the American College of Physicians and of the American Geriatrics Society, and a Member of the Gerontology Society.

E. S. MERTON, Ph.D., is a member of the English Department at The City College, New York.

BENJAMIN KNOX RACHFORD, M.D., was the first Professor of Pediatrics at the University of Cincinnati (then the Medical College of Ohio) and founder of the Cincinnati Babies' Milk Fund Association. He died in 1929.

JACOB SHATZKY, Ph.D., is Research Librarian at the New York State Psychiatric Institute in New York City.

GEOFFREY T. SMERDON is in his final year as a medical student at Oxford University.

Printed in the United States of America
by The Hildreth Press, Inc.
Bristol, Connecticut

Index

Abbott, C. G., 344
Abel, J. J., 234
Abrams, Henry, 372
Abt, A. F., 198
Abt, I. A., 465
Ackerknecht, E. H., 349–50, 465
Adams, J. Q., 344
Adams, Joseph, 80
Addams, Jane, 364, 371
Addison, Thomas, 279
Adelmann, H. B., 130
Albertus Magnus, 119, 125
Aldes, Theodore, 128
Aldrovandus, U., 125, 126
Alexander, Leo, 346–9
Alexander, Martha, 112–13, 225–6
Alger, J. G., 3
Alibert, 219
Alkmaion, 51
Allbutt, *Sir* Clifford, 16, 207
Allen, Charles, 449
American Association for Labor Legislation, 363 *et seq.*
American Economic Association, 363, 368
American Federation of Labor, 373, 387, 389
American Medical Association, 365 *et seq.*
American Philosophical Society, 248, 342
Andernach, J. G. von, 316
Anderson, O. W., 363–96, 470
Andrews, Edmund, 359–61
Andrews, J. A., 465
Andrews, J. B., 363, 364, 372, 373, 377
Andrade, E. N. da C., 213
Anker, Jean, 209
Annals of Science, 210
Annan, Gertrude L., 313
Anselm, *Mme.* Guy d', 43
Anson, B. J., 325
Arnaldo *de Villanova*, 335, 427, 430
Arber, Agnes, 448
Aristotle, 61, 119, 124, 125, 126, 133, 137, 210, 318, 417, 420, 421
Aselli, G., 223, 224
Asling, C. W., 334
Astruc, J., 427
Asula, Anton Bladus de, 448
Attenhofer, Heinrich, 460
Auenbrugger, Leopold, 358
Augustine, 55

Baas, J. H., 289
Babbage, Charles, 252, 253
Babbott, F. L., 198
Bacon, *Sir* Francis, 44, 212, 427, 430
Bacon, Roger, 44
Baer, K. E. von, 417
Baffoni, A., 106
Baillie, G. H., 295
Bainbridge, William, 249
Baird, S. F., 344
Baldichius, 318
Baltimore, *Lord*, 24
Bandinelli, Bartolomeo, 159, 160
Barbette, Paullus, 124, 130
Barbieri, Dominico, 160
Barcacila, Alexandru, 337
Bard, John, 24, 25
Bard, Samuel, 35
Baron, John, 278, 279
Barrett, *Dr.*, 439, 441, 442
Barrocci of Urbino, 162
Bartholin, Caspar, 223
Bartholin, Thomas, 120, 121, 127, 222–4, 320
Barton, B. S., 102
Barton, W. P. C., 246, 247
Bartram, William, 115
Baruch, Simon, 280
Bates, R. S., 344–5
Bauman, *Col.*, 36
Bay, J. Christian, 222–4
Bayle, A. L. J., 289
Bayley, Richard, 37
Beard, Mary, 371, 390
Becker, C. L., 219
Beddoes, Thomas, 14
Beekman, Fenwick, 72–84, 118, 178–96, 232
Behring, Emile, 105
Belinskii, V. G., 107
Bell, Benjamin, 307, 308, 310, 312, 313
Bell, *Sir* Charles, 221
Bellevue Hospital, 351
Bellevue Medical College, 233
Benjamin, J. A., 315–26, 362
Bentham, Jeremy, 8
Benivieni, Antonio, 158
Berengario, Jacopo, 158, 160, 161, 315, 316
Berghoff, Emanuel, 218, 460–1
Bergin, T. G., 218–20
Bergson, Henri, 63, 66, 67, 68
Berkeley, *Lord*, 279
Berkeley, George, 278
Bernard, Claude, 66, 252
Bevan, A. D., 378
Beyer, J. H., 105
Bichat, Xavier, 218, 219
Bick, E. M., 220–1
Bidloo, Govard, 182
Bigelow, H. J., 14
Biggs, Hermann, 380
Bilderbach, J. B., 199
Bilikiewicz, T., 337
Billings, Frank, 378, 380
Billings, J. S., 225
Bishop, W. J., 208

Black, Joseph, 449
Black, William, 44–9
Blaes, Gerard, 120, 121, 127
Blackfan, K. D., 198
Blake, J. B., 450–2, 470
Blanc, Louis, 5
Bleuland, Bell, 337
Bleuland, J., 337
Blue, Rupert, 378, 390
Boas, E. P., 452–4, 470
Boccaccio, 258
Bodichon, Eugene, 9
Boerhaave, Hermann, 69, 75, 77, 182, 465
Boëthus, 210
Bonasone, Giulio, 161, 162
Bonnet, 56
Bonomo, 227
Bontekoe, 56
Bonvicini, 96
Borah, W. E., 391
Borak, J., 325
Borodylin, P. R., 107
Bosanyi, Andor, 198
Boswell, James, 279
Botallo, Leonardo, 315–26
Bowman, William, 221
Boxius, W. C., 401
Boyle, Robert, 126
Bozzi, Augustus, *see* Granville, A. B.
Bragg, *Sir* Lawrence, 213
Branch, John, 244
Brand, Ernst, 280
Brandeis, L. D., 364
Brandywine Academy, 236
Brassavola, A. M., 448
Brazilian Institute of the History of Medicine, 335
Brazilian National Federation of Medical History, 335
Breckenridge, Sophonisba P., 364
Brewster, *Sir* David, 5
Brewster, Mary, 225
Bright, Richard, 113
Brinton, Margaret, 43
British and Foreign Medical Review, 151
British Lying-in Hospital, 290, 297, 298, 301, 303, 309, 310, 313
British Medical Association, 266
British Society for the History of Science, 210
Broad, F. D., 212
Broca, P., 96
Brodie, B. C., 113
Bromfield, *Dr.*, 299
Brouncker, *Lord*, 398
Broussais, 219
Broussonnet, J. L. V., 424
Brown, John, 219
Brown, Marion E., 163–77, 232
Brown-Séquard, C.-E., 14, 354
Browne, *Sir* Thomas, 416–21
Browning, 3, 5
Bryant, W. C., 5
Buckingham, *Duke of*, 279
Budd, *Dr.*, 10
Bullock, L. C., 206
Burke, Edmund, 279, 283
Burney, Fanny, 279
Burns, Gilbert, 285
Burns, Robert, 283, 284–5
Butterfield, H., 212
Buzzard, *Sir* E. F., 354

Cabanis, P. G., 49
Calcar, J. S. van, 159, 161
Cabot, R. C., 371
Caldwell, Charles, 167, 168, 169
California League for Conservation of Public Health, 383
California Social Insurance Commission, 375, 382
Cambridge, Nathaniel, 279
Cambridge, Owen, 276, 279
Cameron, Archibald, 179
Campbell, *Lord*, 9
Campbell, J. M., 336, 449, 450
Campbell, John, 236
Canano, 161
Cannon, Dorothy F., 355–8
Cannon, W. B., 221
Cantarini, M. V., 447
Carlisle Independent, 147
Carlyle, Alexander, 3
Carlyle, Thomas, 5, 9
Caroline, *Queen*, 180
Carpenter, W. B., 7, 17
Carus, C. G., 218
Carvalho, J. C. de, 106
Carwell, *Sir* Robert, 113
Casparis, Horton, 198
Cassirer, Ernst, 96
Castro, Fernando de, 356
Castro, J. de M., 105
Cattell, Jaques, 109
Cellini, Benvenuto, 160, 161
Celsus, 50, 258
Centaurus, 209
Cestoni, 27
Chadwick, *Sir* Edwin, 149
Chamberlain, J. P., 365, 372, 373
Channing, Walter, 14
Chapman, Ernest, 19
Chapman, John, 1–22
Charity Hospital, New Orleans, 351
Charlotte, *Queen*, 313
Charlotte of Saxe-Coburg, *Princess*, 290, 294
Chatterton, T., 269, 275, 278, 279
Chemant, 449
Cheselden, William, 77, 81, 182
Chevalier, A., 291
Chevalier, Thomas, 291
Chopart, 56
Chown, Bruce, 198

Christian IV, *King*, 120
Clarke, *Sir* Andrew, 16
Classy, Samuel, 25
Clausen, S. W., 198
Clegg, H. A., 212
Cleghorn, George, 74
Clendening, Logan, 328
Clifford, Nathaniel, 279
Clifton, Francis, 44–9
Clinton, George, 31, 32, 33, 34, 451
Clowes, William, 221–2
Cobbett, William, 104
Cochran, *Dr.*, 31
Cockburn, *Dr.*, 287
Cockburn, P., 293
Cockburn, Thomas, 292, 293
Cockburn, *Mrs.* Thomas (Sarah Underwood), 292, 293, 302, 303
Cohen, M. R., 342–4
Cohnheim, Julius, 233
Coiter, Volcher, 119, 126, 127
Cole, F. J., 129, 182
Collins, William, 278
Collinson, *Rev.*, 275
Colombo, Realdo, 159
Colonna, 157
Columella, 258
Combe, Charles, 309
Combe, George, 5
Committee on the Costs of Medical Care, 294
Commons, J. R., 363
Company of Surgeons, *see* Royal College of Surgeons, London
Comte, Auguste, 6
Condillac, 219
Conigliano, Cervo, 444
Conigliano, Israel, 444
Conigliano, Salomo, 444
Contarini, Marcantonio, 209–10
Cook, *Capt.* James, 173
Cooke, A. M., 415
Coon, C. S., 457–9
Cooper, A. C., 313
Cooper, *Sir* A. P., 113
Cooper, Page, 350–1
Copernicus, Nicolaus, 212, 329
Copland, *Dr.*, 12
Corner, G. W., 163
Cornwell, J., 291
Cosby, C. B., 280–8, 362
Cotton, F. J., 372, 375
Cowles, J. L., 373
Coxe, Thomas, 398
Cowper, William, 77, 182
Craddock, *Dr.*, 279
Critchley, Macdonald, 353–4
Cromwell, Oliver, 397
Crook, G., 150
Crowninshield, B. W., 239, 240
Crusius, 56
Cruveilhier, Jean, 113
Cruz, Oswaldo, 337
Cuesta, J. J., 335
Cullen, William, 72, 165, 168, 169, 170, 175, 176, 180, 184–6, 190, 194, 195, 283, 449
Cumberland Chronicle, 147
Cummins, S. L., 358–9
Curran, J. A., 466–7
Currie, James (1745–1807), 280, 282, 284
Currie, James (1756–1805), 280–8
Currie, W. W., 285
Curtin, R. G., 465
Curtis, W. G., 377, 384
Curtius, Q., 258
Cushing, Harvey, 235, 328
Cuvier, Georges, 252
Czermak, J. N., 452

Dale, *Sir* Henry, 206, 212
Dan, Phan Huy, 107
Dankmeijer, J., 337
Dante, 212
Darche, Louise, 225
Daremberg, C. V., 121
Darwin, C. R., 7, 213, 221, 329, 339
Darwin, Erasmus, 283
Davis, T. L., 230
Davis, *Mrs.* Edward, 279
Davis, M. M., Jr., 371
Davison, W. C., 197–205, 232, 465–6
Davy, *Sir* Humphry, 14
Dawson, M. M., 373
Decatur, Stephen, 238, 239, 240, 247
Déchambre, A., 289
Delaunay, P., 337
Delphey, E. V., 381
Demainbray, S. C. T., 211
Democritus, 338
Denham, Thomas, 309
Denman, Thomas, 261
Dente, Marco, da Ravenna, 160
Deparcieux, 226
Desaguliers, J. T., 181, 182, 183
Descartes, René, 51 *et seq.*
Desfontaines, *Abbé*, 45
Desgenettes, R.-N. D., *Baron*, 258
Deutch, Albert, 346–9
Devine, E. D., 391
Dewees, W. P., 101, 102, 103
Dézeimeris, J.-E., 289
Dickens, Charles, 5
Dickenson, Charles, 245
Diepgen, Paul, 105, 106
Digby, *Sir* Kenelm, 56
Dingle, Herbert, 206, 212
Dioneus, Jacobus, 318
Dobbin, Leonard, 449
Dobson, Jessie, 213
Dobzhansky, Th., 339–42
Dock, Lavinia, 225

Dodd, Katherine, 198
Donatello, 156
Doten, C. W., 371
Douglas, James, 185–91
Douglas, *Mrs.* James, 187, 190, 193
Douglas, John, 191
Douglas, Martha Jane, 190, 193
Douglas, W. G., 190, 191, 192
Drabkin, I. E., 209, 342–4
Draper, Edith, 225
Drelincourt, 56
Drowne, Solomon, 163
Duane, *Mayor*, 31, 32, 33, 34
Duane, James, 451
Dubnow, S., 446
Duchenne (of Boulogne), G. B., 220–1
Dürer, Albrecht, 158
Duncan, J. M., 74, 78
Dundee Royal Infirmary, 230–1
Dunmore, *Earl of*, 113, 282
DuPont, S. F., 249
Duveen, D. I., 448, 470

Earle, *Dr.*, 216
Ebbell, 352
Eberson, Frederick, 109
Eclectic Repertory, 168
Edelstein, Ludwig, 455, 456
Edinburgh. University. History of medicine lectures, 336
Edinburgh Medical and Surgical Journal, 149, 150, 151, 154
Edinburgh Review, 152
Edwards, William, 275, 279
Eguiguren, L. A., 336
Ehrlich, Paul, 111
Einstein, Albert, 342
Eisenmann, 218
Eliasberg, W. G., 96–101, 118
Eliot, George, *see* Evans, M. A.
Ellis, John, 164–5
Else, Joseph, 305
Ely, R. T., 363, 364
Emerson, R. W., 5
Emmerich, Aaron, 446
Engelhardt, A. v., 105
Engels, Friedrich, 341
Ent, *Sir* George, 398
Erickson, A. B., 144–55, 232
Entralgo, P. L., 335
Ephraem, 343
Erasistratus, 51
Erman, Adolf, 352
Ersch, 210
Esdaile, James, 14
Esté, Augustus d', 112–13
Estienne, Charles, 160, 316
Etziony, M. B., 327–34, 362
Eustachi, Bartolomeo, 316
Evans, Lewis, 210–11
Evans, Mary Ann, 3, 5–6, 8, 9, 19
Evelyn, John, 398
Eyerel, Joseph, 460

Fabricius, H., *ab Aquapendente*, 125, 417, 418, 419, 420, 445
Fabricius, J. C., 164
Falloppio, Gabriele, 329
Faraday, James, 256
Farr, William, 226
Favill, H. B., 375
Feer, 200
Ferchl, 448
Ferdinand II, *Grand Duke of Tuscany*, 122
Ferguson, J. H., 58–95, 118
Ferguson, *Sir* William, 10
Fernel, Jean, 63
Ferrein, Antoine, 192, 194
Ferrier, David, 70
Ficino, Marsilio, 427, 430
Fidler, Anthony, 117
Filene, E. A., 364
Fillmore, Millard, 246
Finlay, C. J., 465
Firth, Douglas, 112–13
Fisch, M. H., 107, 218–20
Fisher, Irving, 367, 372
Fiske, John, 219
Flack, I. H., 345
Flexner, Abraham, 235
Flexner, Simon, 234
Florinas, 329
Floyer, *Sir* John, 280, 285, 286
Folli, Cecilio, 223
Foltz, J. M., 245
Ford, W. J., 215
Formin, Giles, 23
Forster, W. E., 5
Fothergill, John, 12, 74, 81
Fosbroke, T. D., 278, 279
Foulis, Robert, 185
Fox, C. P., 279
Fracastoro, Girolamo, 111, 463–4
France, Samuel, 43
Francis I, *King*, 160
Frank, J. P., 219
Frankel, Charles, 218–19
Frankel, L. K., 364, 365
Frederick II, *King*, 346
Freeman, J. T., 422–31, 470
Freiligrath, 18
Freind, John, 12, 187
Freke, *Dr.*, 215
Frerichs, Theodor, 113
Friedman, Reuben, 227–8
Froude, J. A., 5
Fryer, William, 279
Fulton, J. F., 107
Furuseth, Andrew, 364

Galen, 51, 111, 210, 218, 223, 227, 258, 329, 331, 338, 360, 412, 417, 429, 430
Galilei, Galileo, 329
Gall, F. J., 61
Gamble, J. L., 198, 199, 200, 201–2
Garboe, Axel, 222–4
Gardner, Edward, 269, 271–9
Garrison, F. H., 360, 448
Garthshore, *Dr.*, 299
Gaskell, *Mrs.*, 5
Gassendi, 53, 58, 59
Gay-Lussac, J. L., 4, 252
Gelmo, Paul, 213–4
George I, *King*, 181
George II, *King*, 296
George III, *King*, 113
George IV, *King*, 294
Gesner, Conrad, 105
Gibson, H. J. C., 230–1
Gilesby, George, 37, 38
Girolamo da Carpi, 161
Gladstone, William, 9
Glasgow Art Gallery and Museum, 448
Glasgow. Royal Faculty of Physicians and Surgeons, 448–9
Glasgow Royal Infirmary, 449
Glisson, Francis, 126, 399
Goldwater, S. S., 365, 378
Gompers, Samuel, 364, 373, 387, 388
Goodsir, John, 450
Gordon, Aaron, 446
Gorgas, W. C., 464
Görres, Josef, 105
Goethe, J. W. von, 105
Goldschmidt, E., 337
Goldsmith, Margaret, 110
Goldstein, 65
Gomes, Ordival, 335
Gonce, J. E., 198
Goode, G. B., 344
Gordon, John, 79, 80
Gosch, C. C. A., 223
Gorraeus, Petrus, 318
Goucher College, 351
Gowers, *Sir* William, 353–4
Graaf, Reinier de, 417
Graham, Ebenezer, 37, 38
Graham, *Sir* Fergus, 155
Graham, *Sir* James, 144 *et seq.*
Granjel, L. S., 335
Granville, A. B., 251–68
Grapow, 352
Grashey, 99
Grassi, Battista, 464
Graunt, John, 226
Graves, R. J. (1796–1833), 215
Graves, William, 298, 299
Greeley, Horace, 5
Green, John, 4–5, 8
Green, William, 388
Greenman, David, 170
Greenwood, Major, 226
Greg, W. R., 5
Griffith, Moses, 299
Griffith, S. P., 168–9
Groom, S. H., 212
Grotjahn, 219
Grüber, 210
Gruenberg, E. M., 345–9
Guiart, Jules, 337
Guidi, Guido (Vidus Vidius), 161
Gunther, R. T., 211
Guthrie, Douglas, 108, 336
Gwatkin, R. L., 275, 279

Hacohen, Tobia, 337
Haeser, Heinrich, 235
Haight, G. S., 3, 10, 11, 16, 20
Hale, Donald, 104
Hall, Marshall, 220
Haller, Albrecht von, 56, 127, 129, 170, 173, 175, 187
Halley, Edmund, 226
Halsey, Olga S., 366, 372
Halsted, W. S., 234
Hamilton, Alexander, 33, 450, 451
Hampton, Isabel A., 225–6
Happ, W. M., 198
Harris, C. F., 198
Harris, J. S., 250
Harris, M. L., 378
Harris, Thomas, 236–50
Harris, *Mrs.* Thomas (Ester White MacPherson), 249
Harris, *Mrs.* Thomas (Jane Phillips Hodgdon), 249
Harris, William, 236
Hart, Ernest, 17
Hartley, David, 96
Harvey, Gideon, 45
Harvey, William, 123, 125, 126, 128, 133, 136, 137, 212, 223, 329, 333, 397, 417, 418, 419, 420, 421
Hauptmann, 228
Hawkins, *Sir* Caesar, 294, 296, 299, 303, 306, 307, 311, 313
Hay, Denys, 108
Hayley, William, 270
Head, *Sir* Henry, 65, 68, 96
Headley, J. T., 23
Heaton, Claude, 345, 350–1
Heaviside, John, 313
Hebra, Ferdinand von, 468–9
Heinemann, K., 105
Heischkel-Artelt, 105
Helmholtz, Hermann von, 221
Henry IV, *King*, 423
Henry, Joseph, 344
Herff, *Dr.*, 453–4
Herrera, C. P. de, 335

Herschel, *Sir* John, 253
Herz, Marcus, 97, 99
Heymans, Corneille, 213
Hickman, H. H., 14
Hicks, John, 37
Higgins, H. L., 198
Himmler, Heinrich, 346
Hinde, *Mr.*, 10, 11
Hippocrates, 51, 111, 218, 227, 258, 335, 337, 338, 412
Hippocratic Oath, 349
Hirsch, August, 289
Hirschfeld, Ernst, 219
Hitler, Adolf, 341, 346
Hobbes, Thomas, 226
Hodgdon, Jane P., *see* Harris, *Mrs.* Thomas
Hodgdon, Samuel, 249
Hoefer, 210
Hoff, E. C., 50–71, 118
Hoffman, F. L., 368, 369, 377, 384, 385
Hoffmann, 69, 170
Hoffmann, Erich, 106
Hofmann, Caspar, 223, 224
Hogarth, William, 181
Holler, 447
Holt, L. Emmett, 197, 198
Holt, L. Emmett, Jr., 198
Home, *Sir* Everard, 13, 255
Home, G. F., 206
Homer, 338
Hooke, Robert, 213, 273
Horder, T. J., *Baron*, 465
Horner, G. B. R., 242
Horsley, *Sir* Victor, 354
Howell, Thomas, 389
Howell, W. H., 234
Howland, John, 197–205
Hsu, F. L. K., 459–60
Hucher, Jean, 425
Huffman, O. V., 380
Hughes, *Admiral*, 279
Huibertus, 127
Hume, David, 96
Hume, E. H., 457–60, 467–8
Hunt, T. Leigh, 5
Hunter, James, 188, 190, 191
Hunter, John, 13, 114, 188, 213, 261, 270, 277, 449, 469
Hunter, John, Sr., 186, 188
Hunter, William, 12, 72–84, 178–96, 270, 313, 449
Huskisson, W., 257
Hutcheson, Francis, 78
Hutton, James, 130
Huxley, Julian, 339–42
Hyrtl, Joseph, 323

Ibanez, F. M., 337
Illustrated News, 149, 152
Incián, C. del Valle, 335
Innis, 75
International Congress of the History of Medicine, 336
Ivers, Thomas, 39
Ivy, A. C., 345–9
Izquierdo, J. J., 355–8

Jackson, Andrew, 236, 245
Jackson, C. T., 14
Jackson, J. Hughlings, 65, 68, 354
Jackson, *Mr.* and *Mrs.* William, 432–43
Jackson, Mary, 433–43
Jacobaeus, Matthias, 121
Jacobsen, A. W., 198
James, R. R., 297
James, T. C., 177
Jaramillo-Arango, Jaime, 336
Jarcho, Saul, 320, 359–61
Jay, John, 33, 450, 451
Jebb, *Sir* Richard, 313
Jefferson, Thomas, 39, 280
Jenner, Edward, 213, 269–79
Jenner, H., 279
Jenner, *Sir* William, 354
Jeremić, R., 107
Jessen, K. F. W., 114–15
Johns Hopkins Hospital, 234
Johnson, Andrew, 18
Johnson, F. R., 352
Johnson, H. W., 370, 372, 391
Johnson, Samuel, 273, 276, 279, 285
Jolly, Julius, 457
Jones, A. G. M., 198, 199
Jones, Jacob, 237, 238, 239
Jones, Rayner, 279
Jung, C. G., 335

Kaempffert, Waldemar, 213–14
Kagan, Solomon, 465–6
Kant, Immanuel, 59, 60, 61, 66, 69, 96
Kaplan, E. B., 220–1
Kaye, I., 206
Keen, J. A., 325
Keevil, J. J., 206, 290
Keil, John, 181
Kelley, E. C., 359–61
Kelley, Florence, 364
Kellogg, P. U., 364
Kelly, H. A., 234
Kerchoven, J. P. à, 401
Keynes, G. L., 206
King, Gregory, 226
Kirchvogel, P. A., 105
Kirfel, W., 106
Kisch, Bruno, 444
Kleist, 96
Knapp, L. M., 113–14
Koch, Robert, 2, 17, 111, 233, 358, 359
Kopetzky, S. J., 381
Körbler, J., 337
Kot, 447
Krackowizer, Ernst, 452–4

Kramer, Benjamin, 198
Kuhn, A. S., 163
Kuhn, Adam, 163–77
Kurtt-Wolff, 208

Lachs, 447
Ladenheim, J. C., 23–43, 118, 450, 452
Laennec, R.-T.-H., 252
Laertius, Diogenes, 338
Lamb, D. S., 111
Lambert, Alexander, 365, 375 *et seq.*
Lambert, *Mr.*, 275, 279
Lamego, Luiz, 335
Lamers, A. J. M., 337
Lancet, 148, 152, 153
Lancisi, G. M., 56, 465
Lane, *Sir* W. A., 228–9
Langdon-Brown, *Sir* Walter, 399
Lange, 64
Langley, S. P., 344
Lankester, Edwin, 10, 17
LaPeyronie, 56
Lapp, J. A., 372
Larsell, O., 111–12, 353–4
Lastres, J. B., 106, 336
Lathrop, Julia, 391
Lawrence, Thomas, 194
Laurens, André du, 424, 425, 428
Laveran, Alphonse, 464
Lavoisier, A. L., 14, 287, 288
Lawrence, Alma R., 249
Leake, C. D., 352–3
Lee, Charles, 275, 276, 279
Lee, *Gen.* Charles, 282
Leeuwenhoek, 111, 228
LeFanu, W. R., 206, 279, 313
Leibowitz, Joshua, 337
Leicester, *Earl of*, 279
Leidecker, K. F., 461–2
Leikind, M. C., 110–11
Lenin, N. V. U., 341
Lennon, J. B., 363
Leonardo da Vinci, 156, 158, 160
Leopold of Saxe-Coburg, *Prince*, 293
Letamendi, José de, 335
Lett, *Sir* Hugh, 206
Levinson, Abraham, 465–6
Lewes, G. H., 5, 6
Lewis, F. T., 324
Licetus, 338
Li Ch'iao-P'ing, 229–30
Lilley, S., 212
Limouze, Ellen F., 468–9
Lincoln, Abraham, 249
Lind, L. R., 327, 328, 329, 332, 333, 334
Linnaeus, C. von, 115, 163, 164, 165, 170, 176
Linton, Ralph, 457–60
Lister, Joseph, *Baron*, 111, 252, 449
Liverpool Weekly Herald, 284
Livingston, R. R., 451
Locock, *Dr.*, 12
London Evening Post, 195
London Globe, 152
London Medical Gazette, 147–8, 149
London Medical and Physical Journal, 266
London Morning Chronicle, 144, 152, 153, 154
Long, E. R., 358–9
Longman, 9
Loon, L. van, 337
Lorey, W., 105
Lotze, 69
Louis, 56
Louis IX, *King*, 422
Louis XIII, *King*, 426
Lowe, 126
Lowenthal, *Dr.*, 453
Lucas, A. C. de, 335
Lucius, 152
Ludwig, C., 233
Luria, 69
Lysenko, 339–42
Lyser, Michael, 224

Maar, 124, 127
Macalister, A., 324
MacArthur, *Sir* William, 206, 214–15
Macaulay, 146, 147
McCawley, C. L., 245
Macdonald, Hannah (*Mrs.* John Chapman), 18
Macewen, *Sir* William, 449
McKay, Stewart, 345
McKie, Douglas, 212
MacKinney, L.C., 455–7
McKnight, Charles, 37, 38
Maclean, Charles, 258
MacNalty, *Sir* A. S., 206, 208, 359
MacPherson, Ester White, *see* Harris, *Mrs.* Thomas
Madison, James, 238, 306
Magendie, François, 219, 252, 465
Magni, Albert, 115
Magnus, 318
Maimon, Salomon, 96, 99
Maître-Jan, 128, 129
Major, R. H., 96, 206, 448
Malcolm, *Gen.*, 33, 36
Maler, Koppel, 447
Malfatti, Giovanni, 219
Mall, F. P., 234
Mallory, W. J., 111
Maloney, W. J., 289–314, 362
Malpighi, Marcello, 123, 128, 136, 417
Manson, *Sir* Patrick, 464
Mantegna, Andrea, 157
Manwaring, 14
Margaria, Maria G. de Luca, 463–4
Marie, Pierre, 99
Mariotti, M., 337
Marriott, W. M., 198

Martel, Charles, 422, 425
Marsyas, 157, 160
Marten, Benjamin, 358, 359
Martineau, Harriet, 5
Marx, Karl, 18, 341, 469
Mason, S. F., 211
Master, David, 110
Mateos, A. L., 335
Mathews, Charles, 304
Mathews, James, 304, 306
Maty, Henry, 306
May, J. A., 467–8
May, Margaret T., 119–43, 232, 338
Maynwaring, Everard, 45
Mead, Richard, 45, 77, 182, 186
Medical Intelligencer, 266
Medici, Lorenzo de', 157
Medigo, J. S. del, 445
Meeker, Royal, 373, 384
Meibomius, 127
Melsom, Reidar, 106
Mendelssohn, Moses, 96, 97, 99, 100
Merton, E. S., 416–21, 470
Meyer, E., 115
Michelangelo, 157 *et passim*
Michelet, 219
Michurin, I. V., 339, 340, 341, 342
Middleton, Peter, 24, 25
Mieg, 56
Mielke, Fred, 345–9
Mill, *Lady*, 279
Mill, James, 8
Mill, J. S., 5, 8
Mill, *Sir* Richard, 279
Miller, J. A., 351
Miller, Peter, 102
Millington, 126
Mitin, M. B., 339
Mitscherlich, Alexander, 345–9
Molinetti, 56
Monakow, 63, 65, 67
Monro, Alexander, 72, 165, 173, 175, 180, 183, 191
Monro, Donald, 82
Monro, John, 81
Monserrate, B. M. de, 335
Monthly Miscellany, 278
Moon, G. R., 466–7
Moore, James, 278
Moore, *Sir* Norman, 207, 290
Mora, R. D., 335
Moreno, A. R., 335
Morgagni, G. B., 182, 316, 453, 454
Moritz, C. P., 96
Morpurgo, 447
Morris, *Chief Justice*, 38
Morris, Richard, 451
Morris, William, 207
Morton, L. T., 360, 448
Morton, W. T. G., 14
Moseley, *Dr.*, 270
Mott, Valentine, 43
Müller, R. F. G., 106
Mullett, C. F., 251–68, 362
Munk, William, 289, 290, 399
Munter, Suessman, 337
Murphy, D. P., 325
Murray, *Lady* Augusta, 113
Murray, John, 9, 306
Musgrave, William, 289
Myers, Elsie, 130
Myres, J. N. L., 206

National Assn. of General Practitioners, 149
National Civic Federation, 387
National Industrial Conference Board, 387
Needham, Walter, 126, 127
Neuburger, Max, 44–9, 118, 460–1, 465
Newman, Francis, 5
Newman, J., 344
Newton, *Sir* Isaac, 181, 212, 273
Nicholls, Frank, 181, 182, 183, 194
Nichols, J. B., 111
Nichols, John, 304, 306
Nicholson, *Commander*, 34
Nicolini, Fausto, 220
Nicoll, *Sir* W. R., 3
Nightingale, Florence, 9, 225
Noguchi, Hideyo, 455
Norden, Heinz, 345–9

Obermeyer, Jacob, 344
Ochsner, E. H., 380, 383
O'Connor, James, 373
O'Connor, T. P., 19
Oehser, P. H., 344–5
Oken, Lorenz, 218
Old Ashmolean, 210–11
Oldman, C. B., 206
O'Leary, DeLacy, 342–4
O'Malley, C. D., 328
Oppenheimer, Jane, 113–14
O'Rahilly, 215
Orr, W. J., 198
Osborn, G. F., 313
Osborne, William, 307, 309
Osler, *Sir* William, 207, 208, 234, 465
Oughtred, William, 352
Oswald, *Mr.*, 453, 454
Owen, Richard, 5
Owen, Robert, 191–2

Paechter, H. M., 461–2
Pafford, J. H. P., 206
Paisley, John, 72, 80
Palafox, Silverio, 335
Palmer, *Miss*, 275, 279
Pantin, C. F. A., 213
Papez, J. W., 324
Paracelsus, 105, 111, 280, 461–2

Park, E. A., 198, 201
Parker, John, 37, 38
Parry, C. E., 364
Pasteur, Louis, 111, 212, 337
Paulii, Simon, 124, 223, 224
Payne, J. F., 208
Paz Soldan, C. E., 106, 336
Peabody Museum, Harvard Univ., 349
Peachey, G. C., 84, 180, 181, 189, 191, 192, 194, 195
Peale, Titian, 242
Pecquet, Jean, 224
Peel, *Sir* Robert, 257
Pellegrini, Francesco, 463–4
Pepys, Samuel, 398
Perez, R. I., 106
Perlman, Selig, 392
Peruvian Society for Medical History, 335
Peter, *Prof.*, 18
Peter Aponensis, 430
Pettenkofer, Max von, 17
Petty, William, 226
Pezzi, G., 106
Pflueger, E. F. W., 70, 71
Philadelphia General Hospital, 351
Philip II, *King*, 330
Philip V, *King*, 335
Physick, P. S., 102, 177
Pierce, Franklin, 246
Piercy, *Rt. Hon. Lord*, 206
Pinckney, Ninian, 245
Pinel, Philippe, 219
Pinsent, John, 415
Piozzi, *Mrs.*, 279
Piso, Willem, 124
Pitcairn, 165
Pitt, Robert, 283, 284
Plato, 51
Pliny, 258, 417
Plummer, 75
Polk, J. K., 246
Pollaiuolo, Antonio, 156, 157
Pomerantz, 41
Pomponazzi, Pomponeo, 463
Pope, Alexander, 186
Porter, Noah, 5
Post, *Mr.*, 35
Post, Gains, 447
Postan, M., 212
Pott, *Sir* Percival, 270, 303, 305
Pound, Roscoe, 364
Power, *Mr.*, 10
Powers, G. F., 198
Poynter, F. N. L., 1–22, 118, 208, 213
Prendes, M. A. G., 106
Prezent, I. I., 339
Price, *Mr.*, 279
Price, Martin, 206
Price, Richard, 226
Priestley, Joseph, 9, 14
Pringle, *Sir* John, 180, 227–8
Protagoras, 156
Punch, 147
Puschmann, Theodor, 460
Putnam, G. P., 5
Pythagoras, 51, 342

Quain, Richard, 152
Quarterly Review, 148

Rabelais, François, 425
Rabin, C., 328
Race, Sidney, 2, 3, 19, 20
Rachford, B. K., 432–43, 470
Radbill, S. X., 465
Rae, James, 449
Rae, William, 449–50
Ramón y Cajal, Santiago, 355–8
Ramsay, *Dr.*, 172
Ramsay, W. T., 372
Ranby, John, 296
Ranchin, Étienne, 423
Ranchin, François, 422–31
Ranchin, Jean, 423
Ranchin, William, 423
Raphael, 159
Ratcliffe, J. A., 213
Rath, G., 105
Raven, C. E., 213
Read, B. E., 216–17
Read, G. D., 104
Réaumur, R.-A.-F. de, 172
Recklinghausen, F. von, 233
Redman, John, 103
Reid, Roger, 111
Renouard, P. V., 12
Renucci, 227–8
Reynolds, *Sir* Joshua, 275, 279
Rhees, W. J., 344
Richards, G. T., 212
Riese, Walther, 50–71, 96, 118
Ring, John, 270
Riolan, Jean, 223, 224
Rivers, T. M., 198
Robb-Smith, A. T. H., 415
Robins, F. W., 116–17
Robinson, Byron, 321, 324
Robinson, F., 262, 266
Roddis, L. H., 236–50, 362
Rode, Johan, 223
Rohan, *Duc de*, 422
Romaine, William, 300
Röschlaub, Andreas, 219
Roosevelt, Theodore, 391
Roscoe, *Mr.*, 284
Rosen, George, 115–17, 218–20, 221–2, 226, 228–9, 230–1, 233–5, 342–4, 362, 460–1
Rosenfeldt, 258
Ross, G. S., 198, 199
Ross, *Sir* Ronald, 464

Rossi, Rosso de, 160
Rousseau, J. J., 287
Rowley, William, 305
Royal College of Physicians, Edinburgh, 284, 285, 313
Royal College of Physicians, London, 258, 290, 309, 310, 397, 398, 399
Royal College of Surgeons, Edinburgh, 313
Royal College of Surgeons, London, 269, 279, 289, 296, 297, 300, 302, 305, 306, 310, 311, 313, 449–50
Royal Society, 119, 252–7, 266, 267, 351–2, 398
Rubenstein, I. H., 350
Rubinow, I. M., 364, 365, 368, 369, 370, 373, 376, 377, 393
Rubio, F. L., 337
Rucker, M. P., 101–5
Rudbeck, Olof, 224
Ruschenberger, W. S. W., 242
Rush, Benjamin, 101, 102, 104, 163, 168, 177, 280, 287, 288
Russell, Alexander, 74
Russell, William, 313
Rustici, 159
Rutherford, John, 75
Ryan, J. A., 391

St. Andrews. University, 449
St. Clair, Arthur, 249
St. George's Hospital, 294, 297, 299, 305, 306
St. Jerome, 335
St. John's Hospital, 305
St. Thomas's Hospital, 305
Sala, 223
Sallust, 258
Samoïlowitz, 258
Sanderson, Mrs. Cobden, 19
Sangiorgi, Giuseppe, 106
Saporta, Jean, 424
Sappey, Marie P. C., 360
Sarto, Andrea del, 160
Sastres, *Mr.*, 276, 279
Sato, Akiro, 198
Saucerotte, 56
Saunders, J. B. deC. M., 328
Savonarola, 280
Sayer, *Rev. Mr.*, 279
Scatcherd, J. E., 313
Schaudinn, Fritz, 106
Schelling, 219
Schierbeek, *Dr.*, 336
Schiess, T., 447
Schlichting, *Dr.*, 336
Schönlein, 218
Schopenhauer, 66
Schrader, J., 128
Schubert, G. H. von, 218
Schullian, Dorothy M., 315–26, 362
Schwab, George, 349–50
Schwarz, K. L., 216–17
Schweitzer, Albert, 459
Scott, *Sir* Walter, 283
Seager, H. R., 391
Seide, Jakob, 337
Selden, *Dr.*, 288
Seligmann, Romeo, 460
Semeleder, 452, 453
Semmelweis, J. P., 468–9
Sergius, 210
Severino, 223
Shakespeare, William, 278
Sharp, William, 313
Sharpe, Samuel, 194
Shatsky, Jacob, 444–7, 470
Shattuck, Lemuel, 109–10
Shays, Daniel, 451
Shepherd, E. W., 294
Sherrington, *Sir* Charles, 63, 68, 71, 221, 355–8
Shippen, Edward, 248
Shippen, William, 102, 103, 104, 166
Shnetter, *Dr.*, 453, 454
Short, Thomas, 226
Shorter, Clement, 3
Shrewsbury, J. F. D., 214–15
Shryock, R. H., 336
Sier, H. E., 206
Sigerist, H. E., 460
Signorelli, Luca, 157
Simmons, S. F., 72, 80, 185, 190, 194, 195
Simons, H. J., 457
Simpson, J. Y., 14
Sims, J. M., 16, 345
Sinclair, 75
Singer, Charles, 57, 156–62, 206, 209–10, 232, 328
Skinner, H. A., 359–61
Slade, Matthew, 128
Slaughter, *Gov.*, 24
Sloane, *Sir* Hans, 45, 180
Small, W. D. D., 108
Smallwood, W. M., 163
Smellie, William, 79, 179, 180, 181, 183–4, 189
Smerdon, G. T., 397–415, 470
Smillie, W. G., 109–10
Smith, A. E., 371, 372, 379, 391
Smith, Barbara Leigh, 9, 15
Smith, John, 449
Smith, Octavius, 14, 15
Smith, Southwood, 213
Smith, Sydney, 108
Smith, William, 9
Smithson, James, 344
Smithsonian Institution, 344–5
Smollett, Tobias, 79, 80, 113–14
Smyth, T., 312
Snell, G. D., 325
Snow, John, 14
Soave, M., 447
Société Internationale d'Histoire de Médecine, 336, 337

Soemmerring, S. T. von, 56, 59, 61, 261
South, James, 252, 253
Spalding, 96, 99, 100
Spallanzani, Lazzaro, 172
Spencer, H. R., 309
Spencer, Herbert, 3, 5, 6, 8, 339
Spigelius, 125
Spinoza, Benedictus de, 65
Squarcione, 157
Stahl, G. E., 45, 69, 170
Stangenwald, Hugo, 452, 453
Stanley, *Lord*, 15
Steno, Nicolaus, 119–43, 223, 338
Stephens, G., 313
Stern, Joseph, 444
Sterre, Dionysius van der, 337
Steuben, *Baron* von, 33, 34
Steudel, Johannes, 105
Steuer, R. O., 352–3
Stevens, *Dr.*, 172
Stevenson, L. G., 210–13, 448–9
Stewart, Alexander, 180
Stickman, Johann, 120
Stimson, Dorothy, 351–2
Stoll, Maximilian, 460
Strauss, D. F., 5
Strehl, C., 106
Struthers, John, 82
Stuart, A., *see* Stewart, A.
Stübler, E., 105
Sudhoff, Karl, 235
Süssmilch, J. P., 226
Sullivan, Paul, 43
Summers, William, 291, 295
Sutcliffe, Irene, 225
Sweet, T. C., 371
Swick, Moses, 321
Sydenham, Thomas, 44, 170, 358
Sydenstricker, Edgar, 374
Sylvius, Franciscus, 121

Tait, H. P., 108
Tait, Lawson, 345
Tanner, W. E., 228–9
Taussig, F. W., 364
Taylor, F. S., 211, 212
Taylor, Telford, 345–9
Taylor, Zachary, 246
Teacher, J. H., 191, 192, 194
Tead, Ordway, 372
Temple, *Sir* John, 35
Thacher, James, 169
Thackeray, W. M., 5
Thaddeus Florentinus, 430
Tharpe, *Miss* J. M., 130
Thévenot, N. M., 121, 126, 127
Thillaye, A. J., 289
Thistlewaite, James, 279
Thomas, F. B., 279
Thomas, *Sir* Henry, 206, 208
Thompson, M. T., 468
Thompson, Smith, 238, 241, 242, 243
Thoms, Herbert, 102
Thucydides, 258
Tiemann, *Mr.*, 452
The Times, London, 148, 149, 153, 290
Timiriazev, K. A., 339, 340, 341
Tir[illegible]oschi, 210
Tisdall, F. F., 198
Titian, 159, 161
Tizard, *Sir* Henry, 213
Torinus, Albanus, 329
Torr, John, 298
Torre, M. A. della, 158
Traill, H. D., 145
Trenchard, *Miss*, 279
Trent, Mary D. B., 227–8
Triplett, *Dr.*, 245
Trudeau, E. L., 358, 359
True, W. P., 344
Türck, 452
Tyler, John, 246
Tyrie, C. C. B., 322
Tyson, Edward, 320

Underwood, Caesar, 291 *et passim*
Underwood, E. A., 206–8
Underwood, Hatch, 295
Underwood, Henry, 295
Underwood, James, 291
Underwood, James (1738– ?), 295
Underwood, John (father of Michael), 296
Underwood, John (son of Michael), 291, 292, 295, 302, 303
Underwood, Michael, 289–314
Underwood, Samuel, 291
Underwood, William, 293
Upshur, A. P., 245, 246
U. S. Navy. Medical Dept., 236 *et seq.*; Medical Center, Bethesda, 236, 240
U. S. Public Health Service, 374, 378, 390, 391

Valli, *Dr.*, 258
Valverde, Juan de, 335
Van Horne, 121
Van Sickle, Frederick, 378
Vasari, 156, 157, 159, 160, 161
Vasconcellos, Ivolino de, 105, 335, 337
Vaughn, V. C., 378, 379
Vaz, Rocha, 335
Veith, Ilza, 229–30
Veneziano, Agostino, 160
Verdoorn, Frans, 115
Verrocchio, 156, 157
Vesalius, Andreas, 105, 159, 161, 209, 210, 213, 316, 327–34
Vesling, Johann, 223
Vico, Giambattista, 218–20
Victoria, *Queen*, 113
Viets, H. R., 209

Vieussens, 56
Villemin, J.-A., 358, 359
Villermé, 219
Villiers, 54
Virchow, Rudolf, 219, 233

Wakley, 146, 147
Walcott, C. D., 344
Wald, Lillian D., 225, 391
Wale, Jan de, 223
Wall, Cecil, 308, 309, 310
Wall, J. S., 111
Waltner, Karl, 198
Ware, James, 381
Warkany, Josef, 326
Warren, B. S., 374, 390
Warren, Richard, 294, 299, 302
Warshaw, L. J., 464–5
Wathen, Samuel, 299
Watson, 195
Watson, Malcolm, 464
Weber, E. F. and W. E., 221
Weech, A. A., 198, 199, 202
Welch, W. H., 233–5, 359
Wellcome, *Sir* H. S., 207–8
Wellcome Historical Medical Library, 206–9, 313
Wells, Gabriel, 3
Wells, Horace, 14
Wells, W. C., 12
Wernicke, 96
Westminster Medical Society, 266
Westminster Review, 2 et passim, 145
Weston, William, Jr., 199
Weston, William, Sr., 199
Wetmore, Alexander, 344
Whinyates, Thomas, 237
Whistler, Daniel, 397–415
Whistler, *Mrs.* Daniel (Elizabeth Lowther), 398
Whistler, John, 401
Whistler, Radolph, 401
White, Samuel, 279
White, William, 249
Whitefield, *Rev.* George, 291, 297, 300, 301
Whitehead, *Dr.*, 288
Whitlocke, Bulstrode, 397
Whyte, *Dr.*, 258
Wichmann, J. E., 228
Wickersheimer, E., 337
Wilhelm, *Kaiser*, 383
Wilkes, John, 310
Wilkie, James, 187
Wilks, J., 206
Willey, B., 212
Willis, Thomas, 56, 126
Wilson, J. G., 326
Wilson, Jasper, 284
Wilson, Woodrow, 364, 383
Windakiewicz, Stanislau, 447
Winslow, C.-E. A., 110, 364
Winslow, J. B., 182
Winternitz, Wilhelm, 280
Wiseman, 305
Wistar, Caspar, 102
Wolf, Benjamin, 445
Wolf, Moses, 445
Woll, Matthew, 388
Wood, Anthony à, 398
Wood, Samuel, 269–79, 362
Wood, Thomas, 24
Woodhouse, James, 102
Worgan, J. D., 269–74
Workman, H. B., 343
World Medical Association, 349
Worm, Ole, 223
Wright, William, 285, 286
Wrisberg, H. A., 56
Wundt, 99
Wyman, Donald, 115

Yeend, W. A. J., 295
Yonge, C. D., 338
Young, Sidney, 289

Zamoyski, Jan, 445
Zedler, 210
Zhebrak, A. R., 340
Zimmer, H. R., 455–7
Zimmermann, J. G., 49
Zirkle, Conway, 339–42
Zoega, 164
Zoffany, John, 313

NOT TO BE TAKEN FROM THE LIBRARY

...istory of Medicine

...CLINICS

...1950

THE HISTORY
ALLIED SCIEN

...RY OF MEDICINE AND
...of work relating to
...dentistry, nursing, pha
...impinge on medicine.

...should be sent to the
... ALLIED SCIENCES, Yale Un
... Haven 11, Conn., U
... with tabular matter and
... sheets. Correspondence
... reserve address. Books for
... Henry Schuman, Inc., 20

... be arranged in alphabetical
... abbreviations of journal titles
... *List of Scientific Periodicals*
... University Press, 1934), with
... and pagination of the paper or

... typewritten in double space on
... the text by superior numerals
...

... photographs, should be sharp,
... i.e., with lettering, arrangement, and

... by authors or institutions at the rate
... proofs. Reprint orders must be

... published quarterly in January, April,
... Publication Office is at
... also be entered at any time
... New York 21, N.Y., at the
... postpaid.

... matter at the Post Office at
... March 3, 1879.